

**CLASS 152, RESILIENT TIRES AND WHEELS****SECTION I - CLASS DEFINITION**

This class includes (1) spring wheels for land vehicles; (2) resilient tires for land vehicle wheels; (3) patches for pneumatic tires; (4) anti-skid devices for resilient tires; (5) devices for securing tires to wheels, and (6) pneumatic tire inflating devices combined with the vehicle or wheel or remaining with a particular tire between periods of inflation, or designed to fill one tire from another.

**SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

For devices for giving a warning when the pressure within a pneumatic tire is either raised above or reduced below normal;

(a) If mechanical, see Class 116, Signals and Indicators, subclass 34. This subclass includes such devices incorporated in pneumatic tires but is not limited to devices on the tire or wheel. For devices under (a) wherein a pressure gage is combined with a valved inflation stem or valved filling chucks see Class 137, Fluid Handling, subclasses 227-246.23, and for other valves and other fluid handling devices covered with a pressure gage see subclasses 551-559, particularly subclass 557.

(b) If electrical, see Class 340, Communications: Electrical, subclass 442-448. For devices under (b) wherein the invention is in a circuit breaker, see Class 200, Electricity: Circuit Makers and Breakers, subclasses 61.22-61.26. For devices under (b) wherein the invention is in the electrical resistor combined with an inflation sensing actuator, see Class 338, Electrical Resistors, subclass 37.

**SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS**

SEE OR SEARCH THIS CLASS, SUBCLASS:

337.1, 338.1, 341.1, and 342.1, and 415-431 particularly for wheels or pneumatic tires in combination with inflating valves.  
429, and 430, for devices where the invention lies solely in the connection of the valve to the tire.

**SECTION IV - REFERENCES TO OTHER CLASSES**

SEE OR SEARCH CLASS:

- 5, Beds, appropriate subclasses for inflated pillows and mattresses.
- 69, Leather Manufactures, subclass 21 for the making of leather tires.
- 73, Measuring and Testing, subclasses 146 through 146.8 for a pressure gauge in a tire or wheel installation, and subclasses 700-756 for a pressure gauge of general utility.
- 81, Tools, appropriate subclasses for other tools specialized to use in working on and repairing tires.
- 137, Fluid Handling, subclasses 223 through 234.5 for tire filling chucks and/or stems (see Lines With Other Classes, above), and subclasses 355.16-355.28 for hose holders and hoses disclosed for inflating tires.
- 141, Fluent Material Handling, With Receiver or Receiver Coacting Means, appropriate subclasses for filling with gas, particularly subclass 38 for inflating tires with gas and water.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 110.1 through 135 and 394.1-421.8 for tire making processes and apparatus, respectively.
- 157, Wheelwright Machines, subclasses 1.1 and 11 for devices for applying and removing resilient tires from wheels.
- 222, Dispensing, subclasses 3 through 6 for means for dispensing gases including those disclosed for inflating tires but not restricted in utility thereto.
- 235, Registers, subclasses 1 and 95 for mileage registers incorporated in resilient tires.
- 244, Aeronautics and Astronautics, subclass 103 for resilient aircraft tires and wheels having fins, vanes, or other means to cause the wheel to be rotating when the wheels strike the ground.
- 251, Valves and Valve Actuation, appropriate subclasses for valves, per se.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes within the class definition, for shaping or molding of plastic materials which may involve a vulcanization step; subclass 315 and 326 for specific processes employing a toroidal mold bag or producing a toroidal product. Apparatus for reshaping, resizing or vulcanizing a tire or tire tube is classified elsewhere.
- 280, Land Vehicles, subclass 201 for combinations of inflating means with a velocipede including a modified velocipede frame as part of the combination.

- 295, Railway Wheels and Axles, subclasses 11 through 14 for resilient tires and wheels for railways vehicles.
- 305, Wheel Substitutes for Land Vehicles, subclasses 124 through 142 for spring wheels or resilient tires especially modified to be used in flexible track apparatus for land vehicles. To be placed in Class 305 the wheel as disclosed must include structure which coacts with a flexible track, such as a flanged rim or a grooved rim which structure is adapted to interengage with a portion of a flexible track. Spring wheels or resilient tires which do not incorporate such structure, even though disclosed as being flexible track supporting wheels, are classified in Class 152.
- 417, Pumps, for air pumps, per se, and especially subclasses 229 through 233 for combinations of an inflating pump and a vehicle which operates the pump but not operating to inflate the tire while the vehicle is in motion.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 28.1 through 58.1 for apparatus for reshaping, resizing or vulcanizing a tire or tire tube.
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a stock material product in the form of a single or plural layer web or sheet including strips, strands or fibers, and especially subclasses 105 through 113 for a composite web or sheet in which elements or constituents, (e.g., fibers, strands, etc.) in one layer are disposed at an angle to those in another layer, and subclass 114 for such a web or sheet in which a parallel relationship exists between the constituents of the layers.
- 492, Roll or Roller, appropriate subclasses for a roll, per se, not elsewhere provided for, and see the notes thereunder.
- 520, Synthetic Resins or Natural Rubbers, subclass 1 and indented subclasses, for tire making limited to vulcanization alone or to vulcanization with mere preparation therefor.
- 523, Synthetic Resins or Natural Rubbers, subclass 166 for a composition containing a synthetic resin or natural rubber having utility as a puncture sealant for a pneumatic tire or for use in emergency repair of vehicular tires or to processes of preparing said composition.
- 1 SPRING WHEELS:**  
This subclass is indented under the class definition. Wheels for land vehicles whereby the vehicle is resiliently supported on the roadway by means within the wheel structure other than a resilient tire.  
  
SEE OR SEARCH THIS CLASS, SUBCLASS:  
151, and 375, Note (1), for definition of a resilient tire.
- 2 With lubrication:**  
This subclass is indented under subclass 1. The spring wheel is combined with devices for lubricating moving parts of the wheel or for oiling to prevent rusting of springs.
- 3 Spring enclosure:**  
This subclass is indented under subclass 2. The lubricant for the spring wheel is introduced into a closed chamber containing the springs.
- 4 Cylinder and piston:**  
This subclass is indented under subclass 2. The lubrication for the spring wheel is directed solely to cylinders and pistons therein.
- 5 Deformable ground engaging part:**  
This subclass is indented under subclass 1. Spring wheels in which the portion bearing upon the roadway yields locally under load so that the wheel as a whole does not retain its circular form.  
  
SEE OR SEARCH CLASS:  
172, Earth Working, subclass 543 for a rolling earth working tool with spring teeth and subclass 544 for a rolling earth working tool with spring mounted teeth.  
305, Wheel Substitutes for Land Vehicles, subclass 6 for spring biased elements movably mounted on the rim of a wheel forming ground engaging feet as the wheel rotates.
- 6 With plural spring types:**  
This subclass is indented under subclass 5. The resiliency of the spring wheel with deformable ground engaging part is provided by combined springs of different types, for example, leaf and coil.

## SUBCLASSES

- 7 With rubber spring:**  
This subclass is indented under subclass 5. The resiliency of the spring wheel with deformable ground engaging part is provided by rubber or its equivalent.
- 8 With pneumatic spring:**  
This subclass is indented under subclass 5. The resiliency of the spring wheel with deformable ground engaging part is provided by a chamber or chambers filled with fluid under pressure greater than atmospheric, whether under load or not.
- 9 Annular:**  
This subclass is indented under subclass 8. The pneumatic spring providing the resiliency of the deformable grounding engaging part of the spring wheel forms a continuous ring about the wheel center.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
8, for annular air chambers so combined with cylinders and pistons that the air of the chamber is in direct contact with the piston.
- 10 With air tanks:**  
This subclass is indented under subclass 9. The annular pneumatic spring of the spring wheel with deformable ground engaging part comprises an air chamber in free and unobstructed communication with an annular resilient tire on the wheel so that the pressure of the air in the chamber is applied to such tire. The chamber may or may not be annular. The tire may be pneumatic and the communication with the air chamber direct and continuous throughout the rim zone of the tire so that the chamber formed by the tire is combined with the air chamber to form a continuous single chamber.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
345.1, for similar devices constituting a sectional pneumatic tire.  
155 through 166, for similar devices constituting a combined cushion and pneumatic tire.  
418, for similar devices wherein the air in the chamber is fed to the tire at reduced pressure.
- 11 With leaf spring:**  
This subclass is indented under subclass 5. The resiliency of the spring wheel with deformable ground engaging part is provided by leaf springs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
253 through 260 and 270-283 for similar structure in a spring tire.
- 12 End secured:**  
This subclass is indented under subclass 11. The leaf springs providing the resiliency of the deformable ground engaging part of the spring wheel have their inner ends positively secured in fixed relation to the wheel center. The outer ends may or may not be secured but the springs are secured at no points but their ends.
- 13 With coil spring:**  
This subclass is indented under subclass 5. The resiliency of the spring wheel with deformable ground engaging part is provided by coil springs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261 through 267, 284-299 for similar structure in a spring tire.
- 14 Radial:**  
This subclass is indented under subclass 13. The coil springs providing the resiliency of the deformable ground engaging part of the spring wheel are arranged with their axes extending radially of the axis of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
262 through 266, 289-299 for similar structure in a spring tire.
- 15 Cylinder and piston supported:**  
This subclass is indented under subclass 14. The radial coil springs providing the resiliency of the deformable ground engaging part of the spring wheel are each combined with a cylinder and piston, the coil being either enclosed within the cylinder or encircling the assembled cylinder and piston.

**16 Encircled rod supported:**

This subclass is indented under subclass 14. The radial coil springs providing the resiliency of the deformable ground engaging part of the spring wheel have rods extending through them lengthwise.

**17 Spring encircling rigid annulus:**

This subclass is indented under subclass 1. Spring wheels having an annular inflexible portion which extends about the wheel outside of the springs. The springs are located radially inwardly of the annulus and resiliently support the annulus against radial motion relative to the wheel center.

**18 With nonresilient overload stop:**

This subclass is indented under subclass 17. The spring wheel with spring encircling rigid annulus is provided with means independent of the springs whereby radial motion of the rigid annulus relative to the wheel center is positively limited.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

29, through 39, for resilient overload stops.  
158, for overload stops inside the structure of a pneumatic tire.  
165, 166 for overload stops on the outside of the structure of a pneumatic tire.

SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, subclasses 39.1-40.5 for overload stops associated with a pneumatic tire, but separate therefrom.

**19 Convertible to rigid wheel:**

This subclass is indented under subclass 17. The spring wheel with spring encircling rigid annulus is provided with means to secure said rigid annulus rigidly to the wheel center. This converts the spring wheel into a rigid wheel and is for temporary use when springs are broken.

**20 With flexible annular support:**

This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by a

flexible strap, band, cable or chain extending about the wheel. The flexible element is not a spring in the ordinary sense of the term.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40, 47 through 52 for rubber springs extending continuously about the wheel.  
56 through 68 for pneumatic springs extending continuously about the wheel.  
69, for leaf springs extending continuously about the wheel  
92, for coil springs extending continuously about the wheel.

**21 Lateral thrust or tension:**

This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by mechanism wherein thrust or tension is applied to the springs laterally of the wheel.

**22 Combined spring and friction:**

This subclass is indented under subclass 21. The lateral thrust or tension mechanism supporting the spring encircling rigid annulus comprises devices wherein friction between two moving elements is increased by spring pressure.

**23 Coil springs:**

This subclass is indented under subclass 22. In a spring wheel having a spring encircling rigid annulus supported by lateral thrust or tension mechanism involving combined spring and friction devices, the springs are coil springs.

**24 Double thrust:**

This subclass is indented under subclass 23. The lateral thrust or tension mechanism supporting the spring encircling rigid annulus comprises combined coil springs and friction devices so arranged that the springs are acted upon in both directions at once transversely of the wheel.

- 25 With coil springs:**  
This subclass is indented under subclass 21. The lateral thrust or tension mechanism supporting the spring encircling rigid annulus comprises coil springs.
- 26 Rod encircling:**  
This subclass is indented under subclass 25. The lateral thrust or tension mechanism supporting the spring encircling rigid annulus comprises coil springs having rods extending through them lengthwise.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
25, for such structure wherein the spring encircles the hub.
- 27 With balls:**  
This subclass is indented under subclass 21. The lateral thrust or tension mechanism supporting the spring encircling rigid annulus comprises force transmitting balls.
- 28 Combined spring and friction:**  
This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by devices wherein friction between two moving elements is increased by spring pressure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
81, for single end secured leaf springs wherein the free end may have some friction.
- 29 With plural spring types:**  
This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by combined springs of different types, for example, rubber, leaf and coil.
- 30 Rubber and pneumatic:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to rubber and pneumatic springs.
- 31 Rubber and leaf:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to rubber and leaf springs.
- 32 Rubber and coil:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to rubber and coil springs.
- 33 Annular rubber:**  
This subclass is indented under subclass 32. In a spring wheel having a spring encircling rigid annulus supported by plural spring types limited to rubber and coil springs, the rubber spring forms a continuous ring about the wheel center.
- 34 Pneumatic and leaf:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to pneumatic and leaf springs.
- 35 Pneumatic and coil:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to pneumatic and coil springs.
- 36 Annular pneumatic:**  
This subclass is indented under subclass 35. In a spring wheel having a spring encircling rigid annulus supported by plural spring types limited to pneumatic and coil springs, the pneumatic spring forms a continuous ring about the wheel center.
- 37 Leaf and coil:**  
This subclass is indented under subclass 29. In a spring wheel having a spring encircling rigid annulus supported by plural spring types, said types are limited to leaf and coil springs.

- 38 Center secured leaf:**  
This subclass is indented under subclass 37. In a spring wheel having a spring encircling rigid annulus supported by leaf and coil springs only the leaf springs have their centers positively secured in fixed relation to the rigid annulus or to the wheel center. This subclass includes leaf springs which are additionally secured at their ends.
- 39 End secured leaf:**  
This subclass is indented under subclass 37. In a spring wheel having a spring encircling rigid annulus supported by leaf and coil springs only, the leaf springs have their opposite ends positively secured in fixed relation to the rigid annulus and the wheel center, respectively, or one end only so secured to the rigid annulus or wheel center.
- 40 Rubber spring:**  
This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by rubber or its equivalent. This subclass includes closed rubber chambers wherein the pressure is atmospheric.  
  
SEE OR SEARCH THIS CLASS, SUB-CLASS:  
53 through 68, for closed rubber chambers wherein the pressure is more than atmospheric.
- 41 In shear:**  
This subclass is indented under subclass 40. The rubber spring supporting the spring encircling rigid annulus in the spring wheel is so constructed and arranged that the rubber is subjected to angular distortion when the wheel is under load.  
  
SEE OR SEARCH THIS CLASS, SUB-CLASS:  
44, through 46, for spring wheels wherein rubber block or balls are so arranged that they are placed under shear when positioned adjacent the horizontal center line of the wheel, but which take vertical thrust without shear when positioned adjacent the vertical center line.
- 42 Cylindrical:**  
This subclass is indented under subclass 40. The rubber springs supporting the spring encircling rigid annulus in the spring wheel are cylindrical in the ordinary sense of the term and have flat ends. They may be tubular and may surround bolts or spokes.
- 43 Transverse:**  
This subclass is indented under subclass 42. The cylindrical rubber springs supporting the spring encircling rigid annulus in the spring wheel are arranged with their axes extending crosswise of the wheel.  
  
SEE OR SEARCH THIS CLASS, SUB-CLASS:  
53, for similarly constructed and arranged pneumatic springs.
- 44 Blocks or balls:**  
This subclass is indented under subclass 40. The rubber springs supporting the spring encircling rigid annulus in the spring wheel consist of individual rubber blocks or balls as distinguished from sheets, cords or annular formations.
- 45 With drive:**  
This subclass is indented under subclass 44. In a spring wheel having a spring encircling rigid annulus supported by rubber blocks or balls, said rigid annulus is held against rotation relative to the wheel center, either by modification of wheel or spring elements or by additional means. This subclass includes drive through the springs.  
  
SEE OR SEARCH THIS CLASS, SUB-CLASS:  
40, through 44, for patents wherein the drive is by means of friction, cement or vulcanization and involves no modification of wheel or spring elements.
- 46 With separate annulus guide:**  
This subclass is indented under subclass 45. In a spring wheel having a spring encircling rigid annulus supported blocks or balls and having drive means, the rigid annulus is held against lateral movement relative to the wheel center by means other than the springs. This

includes devices which hold the rigid annulus against lateral movement in one direction only.

**47 Annular:**  
This subclass is indented under subclass 40. The rubber spring supporting the spring encircling rigid annulus in the spring wheel forms a continuous ring about the wheel center.

**48 Rigid annulus enclosing:**  
This subclass is indented under subclass 47. The annular rubber spring supporting the spring encircling rigid annulus in the spring wheel completely encloses said rigid annulus either by embedding or by enclosure in an annular chamber.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

57, for similar arrangement of an annular pneumatic spring.

251, for similar devices wherein the spring encircling annulus is not rigid.

**49 Plural:**  
This subclass is indented under subclass 47. In a spring wheel having a spring encircling rigid annulus supported by an annular rubber spring, there are more than one of such springs.

**50 With separate annulus guide:**  
This subclass is indented under subclass 47. In a spring wheel having a spring encircling rigid annulus supported by an annular rubber spring, said rigid annulus is held against lateral movement relative to the wheel center by means other than said spring. This includes devices which hold the rigid annulus against lateral movement in one direction only.

**51 Combined drive:**  
This subclass is indented under subclass 50. In a spring wheel having a spring encircling rigid annulus supported by an annular rubber spring and having guide means, said rigid annulus is held against rotation relative to the wheel center, either by modification of wheel or spring elements or by additional means. This subclass includes drive through the springs.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

47, through 50, for patents wherein the drive is by means of friction, cement or vulcanization, and involves no modification of wheel or spring elements.

**52 With drive:**  
This subclass is indented under subclass 47. In a spring wheel having a spring encircling rigid annulus supported by an annular rubber spring, said rigid annulus is held against rotation relative to the wheel center, either by modification of wheel or spring elements or by additional means. This subclass includes drive through the spring.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40, through 42 and 47, for devices wherein the drive is by means of friction, cement or vulcanization, and involves no modification of wheel or spring elements.

**53 Pneumatic spring:**  
This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by a chamber or chambers filled with fluid under pressure greater than atmospheric, whether under load or not, with the exception of ... indented hereunder, wherein the pressure may at times be atmospheric or less.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40 through 52, for spring wheels with chambers having elastic walls wherein the pressure is atmospheric.

**54 Link connected:**  
This subclass is indented under subclass 53. The pneumatic springs supporting the spring encircling rigid annulus in the spring wheel are combined with movable rigid links which transmit force to or from the springs. The links are usually pivotally connected to wheel or spring parts but may merely bear upon the combined parts without positive connection.

**55 Cylinder and piston:**

This subclass is indented under subclass 53. The pneumatic springs supporting the spring encircling rigid annulus in the spring wheel each consists of a cylinder and piston wherein air in the cylinder cushions the piston against telescoping action.

**56 Annular:**

This subclass is indented under subclass 53. The pneumatic spring supporting the spring encircling rigid annulus in the spring wheel forms a continuous ring about the wheel center.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

55, for annular chambers combined with cylinders and pistons.  
60, 67 for such structure wherein the pneumatic spring is fixed to the rigid annulus, thereby forming a positive driving connection through the spring.  
159, 161, for similar structure in a pneumatic tire.

**57 Rigid annulus enclosing:**

This subclass is indented under subclass 56. The annular pneumatic spring supporting the spring encircling rigid annulus in the spring wheel completely encloses said rigid annulus, either by embedding or by enclosure in an annular chamber.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

48, for similar arrangement of an annular rubber spring.  
200, for similar devices wherein the spring encircling annulus is not rigid.

**58 Plural:**

This subclass is indented under subclass 56. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, there are more than one of such springs.

**59 With separate annulus guide:**

This subclass is indented under subclass 56. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, said rigid annulus is held against lateral movement relative to the wheel center

by means other than said spring. This includes devices which hold the rigid annulus against lateral movement in one direction only.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

162 through 164, for similar structure in a pneumatic tire.

**60 Combined drive:**

This subclass is indented under subclass 59. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring and having guide means, said rigid annulus is held against rotation relative to the wheel center, either by modification of wheel or spring elements or by additional means. This subclass includes drive through the springs.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

56 through 59, for such devices wherein the drive is by means of friction, cement or vulcanization and involves no modification of wheel or spring elements.

**61 Spring:**

This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring with guide means and combined drive, the drive is cushioned.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

30, 34, and 35, for annular pneumatic springs in combination with springs of different types which act as both support and drive springs.

**62 Links:**

This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with guide means and combined drive, the drive consists of a link or links pivotally or flexibly connecting said rigid annulus to the wheel center.

- 63 Radial:**  
This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with guide means and combined drive, the drive consists of fixed radially extending elements on the rigid annulus engaging an element on the wheel center or vice versa.
- 64 Studs or lugs:**  
This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with guide means and combined drive, the drive consists of a laterally extending stud on the rigid annulus engaging an element on the wheel center or vice versa.
- 65 Through bolts:**  
This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with guide means and combined drive, the drive consists of a bolt or its equivalent passing through both the rigid annulus and a part fixed to the hub or axle, one of said elements having a clearance for the bolt to allow relative radial movement between the parts.
- 66 Anti-creep:**  
This subclass is indented under subclass 60. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with guide means and combined drive, the drive consists of interfitting irregularities of the contacting annular surfaces of the rigid annulus and the annular spring, or of irregularities upon the rigid annulus which indent the spring.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
384, for anti-creep devices to prevent creeping of pneumatic tires on their rims.
- 67 With drive:**  
This subclass is indented under subclass 56. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, said rigid annulus is held against rotation relative to the wheel center, either by modification of wheel or spring elements or by additional means. This subclass includes drive through the springs.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
56 through 59, for such devices wherein the drive is by means of friction, cement or vulcanization and involves no modification of wheel or spring elements.
- 68 Anti-creep:**  
This subclass is indented under subclass 67. In a spring wheel having a spring encircling rigid annulus supported by an annular pneumatic spring, with drive, the drive consists of interfitting irregularities of the contacting annular surfaces of the rigid annulus and the annular spring, or of irregularities upon the rigid annulus which indent the spring.
- 69 Leaf spring:**  
This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by leaf springs.
- 70 With braces:**  
This subclass is indented under subclass 69. The leaf spring support for the spring encircling rigid annulus in the spring wheel has its springs supported intermediate their points of securement to the wheel center and said rigid annulus. The second-mentioned support may be by way of attachment of the springs to each other intermediate their length or by way of elements extending radially from the hub or rim and bearing upon the springs either laterally or circumferentially. The supports act directly upon the springs and may be either rigid or spring.
- (1) Note. For leaf springs attached to each other at their ends, see this class, subclass 69.
- (2) Note. For elements extending radially from the hub and bearing laterally upon the rim, see this class, subclasses 77, 78, 82, and 83.

- 71 Link connected:**  
This subclass is indented under subclass 69. The leaf springs supporting the spring encircling rigid annulus in the spring wheel are combined with movable rigid links which transmit force to or from the springs. These links are usually pivotally connected but may merely bear upon the combined parts without positive connection.
- 72 Variously arranged:**  
This subclass is indented under subclass 69. The leaf spring support for the spring encircling rigid annulus in the spring wheel consists of a plurality of leaf springs some of which are arranged within the wheel differently from others. The difference must be such that each spring arrangement would fall in a different subclass hereunder.
- 73 Cylindrical units:**  
This subclass is indented under subclass 69. Each of the leaf spring supports for the spring encircling rigid annulus in the spring wheel consists of one or more springs formed into an element with a substantially cylindrical periphery. This includes cylindrical springs which extend about the wheel.
- (1) Note. For continuous or endless springs of irregular formation, see this class, subclass 69.
- (2) Note. Compare this class, subclass 20.
- 74 Transverse:**  
This subclass is indented under subclass 69. The leaf spring supports for the spring encircling rigid annulus in the spring wheel extend crosswise of the plane of the wheel. This includes springs extending diagonally laterally of the wheel.
- 75 Straight, radial or tangential:**  
This subclass is indented under subclass 69. The leaf spring supports for the spring encircling rigid annulus in the spring wheel are without curvature and arranged either radially or tangentially with respect to the wheel center.
- 76 Center secured:**  
This subclass is indented under subclass 69. The leaf spring supports for the spring encircling rigid annulus in the spring wheel have their centers positively secured in the fixed relation to said rigid annulus or to the wheel center. This subclass includes leaf springs which are additionally secured at their ends.
- (1) Note. For similarly secured leaf springs in a spring tire, see this class, subclasses 255 and 272.
- (2) Note. For wheels wherein the springs are not positively secured in place, see this class, subclass 69.
- 77 With separate annulus guide:**  
This subclass is indented under subclass 76. In a spring wheel having a spring encircling rigid annulus supported by center secured leaf springs, said rigid annulus is held against lateral movement relative to the wheel center by means other than the springs. This includes devices which hold the rigid annulus against lateral movement in one direction only.
- (1) Note. For similar structure in a pneumatic tire, see this class, subclasses 162-164.
- 78 Combined drive:**  
This subclass is indented under subclass 77. In a spring wheel having a spring encircling rigid annulus supported by center secured leaf springs, with guide means, said rigid annulus is held against rotation relative to the wheel center by means other than said springs, or in addition thereto.
- 79 Reversely curved:**  
This subclass is indented under subclass 76. Each of the center secured leaf spring supports for the spring encircling rigid annulus in the spring wheel is reversely curved. This subclass includes springs having straight portions.
- 80 End secured:**  
This subclass is indented under subclass 69. The leaf spring supports for the spring encircling rigid annulus in the spring wheel have their opposite ends positively secured in fixed

relation to said rigid annulus and the wheel center, respectively.

- (1) Note. For end secured leaf springs also secured at their centers, see this class, subclass 76 and indented subclasses.
- (2) Note. For leaf springs secured to each other or to supports, see this class, subclass 70.
- (3) Note. For similarly secured leaf springs in a spring tire, see this class, subclasses 256 and 273.
- (4) Note. For wheels wherein the springs are not positively secured in place, see this class, subclass 69.

### 81 **Single end:**

This subclass is indented under subclass 80. The end secured leaf spring supports for the spring encircling rigid annulus in the spring wheel are fixedly secured at one end only.

- (1) Note. For single end secured leaf springs also secured at their centers, see this class, subclass 76.
- (2) Note. For similarly secured leaf springs in a spring tire, see this class, subclasses 257 and 274.

### 82 **With separate annulus guide:**

This subclass is indented under subclass 80. In a spring wheel having a spring encircling rigid annulus supported by end secured leaf springs, said rigid annulus is held against lateral movement relative to the wheel center by means other than said springs. This includes devices which hold the rigid annulus against lateral movement in one direction only.

- (1) Note. For similar structure in a pneumatic tire, see this class, subclasses 162-164.

### 83 **Combined drive:**

This subclass is indented under subclass 82. In a spring wheel having a spring encircling rigid annulus supported by end secured leaf springs, with guide means, said rigid annulus is held against rotation relative to the wheel cen-

ter by means other than the springs or in addition thereto.

### 84 **Oppositely curved pairs:**

This subclass is indented under subclass 80. The end secured leaf spring supports for the spring encircling rigid annulus in the spring wheel are at least in part curved, and arranged in pairs wherein one spring of each pair curves oppositely from the other. This subclass includes springs having straight portions.

- (1) Note. For center secured oppositely curved pairs, see this class, subclasses 76-79.

### 85 **Reversely curved springs:**

This subclass is indented under subclass 80. Each of the end secured leaf spring supports for the spring encircling rigid annulus in the spring wheel is reversely curved. This subclass includes springs having straight portions.

- (1) Note. For such springs arranged in pairs with opposite curvature, see this class, subclass 84.

### 86 **Arcuate:**

This subclass is indented under subclass 80. The end secured leaf spring supports for the spring encircling rigid annulus in the spring wheel are curved from end to end substantially on an arc of a single circle.

- (1) Note. For such springs arranged in pairs with opposite curvature, see this class, subclass 84.
- (2) Note. For similar springs having straight portions, see this class, subclasses 80-83.

### 87 **Coil spring:**

This subclass is indented under subclass 17. The spring encircling rigid annulus in the spring wheel is resiliently supported against radial motion relative to the wheel center by coil springs. The term "coil" is used to include coil, helical and volute springs.

### 88 **Link connected:**

This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel are combined with movable rigid links which

- transmit force to or from the springs. These links are usually pivotally connected to wheel or spring parts but may merely bear upon the combined parts without positive connection. The links are located outside of the springs as distinguished from spring encircled links.
- (1) Note. For spring encircled links, see this class, subclasses 103 and 104.
- 89 Variouly arranged:**  
This subclass is indented under subclass 87. The coil spring support for the spring encircling rigid annulus in the spring wheel consists of a plurality of coil springs, some of which are arranged within the wheel differently from others. The difference must be such that each spring arrangement would fall in a different subclass hereunder.
- (1) Note. For coil drive springs arranged differently from supporting springs, see this class, subclasses 101, 104 and 107.
- 90 Tangential and radial:**  
This subclass is indented under subclass 89. The coil spring support for the spring encircling rigid annulus in the spring wheel consists of a plurality of springs, some of the springs being arranged with their axes extending tangentially to the axis of the wheel and the remainder of the springs being arranged with their axes extending radially of the axis of the wheel.
- (1) Note. For tangential drive springs, see this class, subclasses 101, 104 and 107.
- 91 Diagonal:**  
This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel have their axes extending diagonally laterally of the wheel.
- 92 Circumferential:**  
This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel have their axes extending circumferentially of the wheel, arcuately parallel to the wheel periphery.
- 93 Tangential:**  
This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel are arranged with their axes extending tangentially to the axis of the wheel.
- 94 Transverse:**  
This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel are arranged with their axes extending crosswise of the wheel.
- 95 Center secured:**  
This subclass is indented under subclass 94. The transverse coil springs supporting the spring encircling rigid annulus in the spring wheel are constructed and arranged so that one end of the spring is supported at or adjacent the axis of the spring coil.
- 96 Concentric with wheel axis:**  
This subclass is indented under subclass 94. The title defines the subclass.
- 97 Radial:**  
This subclass is indented under subclass 87. The coil springs supporting the spring encircling rigid annulus in the spring wheel are arranged with their axes extending radially of the axis of the wheel.
- 98 Tandem, interposed bearing:**  
This subclass is indented under subclass 97. The radial coil spring supporting the spring encircling rigid annulus in the spring wheel consist of sets of two or more springs, one spring of each set being arranged radially outwardly of another with a fixed bearing between their adjacent ends. The bearing may be fixed with relation to either the rigid annulus or the wheel center.
- 99 Telescoping cylinder supported:**  
This subclass is indented under subclass 97. The radial coil springs supporting the spring encircling rigid annulus in the spring wheel are each combined with cylinders which telescope one within another, the coil being either enclosed within the cylinders or encircling the assembled cylinders.

- 100 Cylinder and piston supported:**  
This subclass is indented under subclass 97. The radial coil springs supporting the spring encircling rigid annulus in the spring wheel are each combined with a cylinder and piston, the coil being either enclosed within the cylinder or encircling the assembled cylinder and piston.
- 101 With separate drive:**  
This subclass is indented under subclass 100. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs with cylinders and pistons, said rigid annulus is held against rotation relative to the wheel center by means other than the springs, cylinders and pistons, or in addition to such springs, cylinders or pistons.
- 102 Double acting:**  
This subclass is indented under subclass 100. In a spring wheel with cylinder and piston supported radial coil springs supporting a spring encircling rigid annulus the construction and arrangement is such that each spring acts both in compression and tension. In another species included in this subclass the springs are limited to compression or tension but act whether the local space between the rigid annulus and the wheel center is increased or decreased, that is, they act whether at the temporary top or bottom of the wheel.  
  
(1) Note. Compare this class, subclass 98.
- 103 Encircled rod supported:**  
This subclass is indented under subclass 97. The radial coil springs supporting the spring encircling rigid annulus in the spring wheel have rods or links extending through them lengthwise.
- 104 With independent annulus guide and drive:**  
This subclass is indented under subclass 103. In a spring wheel having a spring encircling rigid annulus supported by radial rod encircling coil springs, the rigid annulus is held against lateral movement relative to the wheel center by means other than the rods and springs and is held against rotation relative to the wheel center by means other than the rods and springs, or in addition to such rods and springs.
- 105 With separate annulus guide:**  
This subclass is indented under subclass 97. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, said rigid annulus is held against lateral movement relative to the wheel center by means other than the springs. This includes devices which hold the rigid part against lateral movement in one direction only.  
  
(1) Note. For similar structure in a pneumatic tire, see this class, subclasses 162-164.
- 106 Combined drive:**  
This subclass is indented under subclass 105. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, with guide means, said rigid annulus is held against rotation relative to the wheel center by means other than said springs, or in addition thereto.
- 107 Spring:**  
This subclass is indented under subclass 106. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, with guide means and combined drive, the drive is cushioned.  
  
(1) Note. For radial coil springs in combination with differently arranged coil springs which act as both support and drive springs, see this class, subclasses 89 and 90.  
  
(2) Note. For radial coil springs in combination with springs of different type which act as both support and drive springs, see this class, subclasses 32, 35 and 37-39.  
  
(3) Note. For tangential coil springs which act as both support and drive springs, see this class, subclass 93.  
  
(4) Note. For circumferential coil springs which act as both support and drive springs, see this class, subclass 92.
- 108 Links:**  
This subclass is indented under subclass 106. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs,

with guide means and combined drive, the drive consists of a link or links pivotally or flexibly connecting said rigid annulus to the wheel center.

**109 Radial:**

This subclass is indented under subclass 106. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, with guide means and combined drive, the drive consists of fixed radially extended elements on the rigid annulus engaging an element on the wheel center, or vice versa.

**110 Studs or lugs:**

This subclass is indented under subclass 106. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, with guide means and combined drive, the drive consists of a laterally extending projection on the rigid annulus engaging an element on the wheel center, or vice versa.

**111 Through bolts:**

This subclass is indented under subclass 106. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, with guide means and combined drive, the drive consists of a bolt or its equivalent passing through both the rigid annulus and a part fixed to the hub or axle, one of said parts having a clearance for the bolt to allow relative radial movement between the parts.

**112 With separate drive:**

This subclass is indented under subclass 97. In a spring wheel having a spring encircling rigid annulus supported by radial coil springs, said rigid annulus is held against rotation relative to the wheel center by means other than the springs, or in addition thereto.

**151 TIRES, RESILIENT:**

This subclass is indented under the class definition. Devices for application outside the periphery of that fixed rigid element of a land vehicle wheel generally known as a rim or tire, to absorb road shocks.

- (1) Note. Any combinations of spring wheel and resilient tire will be found in this class, under "Spring wheels", subclasses 1-112.

- (2) Note. For resilient tires specially adapted for use with railway vehicles, see Class 295, Railway Wheels and Axles, subclass 11 and indented subclasses.

- (3) Note. Nonresilient tires are in Class 301, Land Vehicles: Wheels and Axles, subclass 86 and indented subclasses.

- (4) Note. For a rolling earth working tool with a yieldable rim see Class 172, Earth Working, subclass 519.

**152 Emergency:**

This subclass is indented under subclass 151. Resilient tires constructed and arranged for rapid and convenient manual application upon a rim to replace temporarily the ordinary tire. These are usually cushion tires intended to replace temporarily punctured pneumatic tires.

- (1) Note. For circumferentially adjustable securing means to bind the tire on the rim, see this class, subclasses 279, 283, 307, 388, and indented subclasses, and 399.

- (2) Note. For tires constructed and arranged for use with or in addition to the ordinary tire for emergency purposes, see Class 301, Land Vehicles: Wheels and Axles, subclasses 39.1+.

**152.1 With electrical conducting means:**

This subclass is indented under subclass 151. Subject matter wherein means are provided integral or permanently associated with the resilient tire in order to conduct an electrical current in, on or through the resilient tire.

- (1) Note. The electrical conducting means may possess heat dissipating characteristics.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 153, for resilient tires with cooling devices and subclass 521 for a pneumatic tire with means enabling restricted operation in damaged or deflated condition which is further provided with internal lubrication or cooling.

**153 With cooling devices:**

This subclass is indented under subclass 151. Structure built into the tire or wheel and arranged to cool the tire when in use.

- (1) Note. For brake cooling devices, see Class 301, Land Vehicles: Wheels and Axles, subclasses 6.1+.

**154 With splash guards:**

This subclass is indented under subclass 151. Resilient tires having devices integral therewith or permanently attached thereto for preventing the tire from splashing mud or water.

- (1) Note. For splash guards attached to the wheel or rim, see Class 280, Land Vehicles, subclass 156.

**154.1 With balancing feature:**

This subclass is indented under subclass 151. Subject matter wherein the resilient tire is provided with means integral therewith or permanently associated therewith or attached thereto for statically or dynamically balancing the resilient tire.

**SEE OR SEARCH CLASS:**

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 75 for surface bonding processes involving balancing of the resultant product.  
301, Land Vehicles: Wheels and Axles, subclasses 5.21+ for a balancing device for a vehicle wheel.

**154.2 With wear indicating feature:**

This subclass is indented under subclass 151. Subject matter wherein the resilient tire is provided with means integral therewith or attached thereto to indicate tire abrasion, (e.g., by abrasion of specified tire portion or material).

**155 Cushion and pneumatic combined:**

This subclass is indented under subclass 151. The tire comprises both cushion tire features and pneumatic tire features.

**156 Metallic spring cushion:**

This subclass is indented under subclass 155. The cushion feature comprises metal springs.

- (1) Note. For metallic spring cushion tires, per se, see this class, subclass 247 and indented subclasses.

**157 Enclosed cushion:**

This subclass is indented under subclass 155. The cushion tire feature of the combined cushion and pneumatic tire is completely enclosed.

- (1) Note. For tires embodying an enclosed cushion, but without the pneumatic feature, see this class, subclass 310 and indented subclasses.

**158 Internal buffers:**

This subclass is indented under subclass 157. Protruding into the chamber constituting the pneumatic means is an element which takes the load only when the pneumatic means is deflated or is distorted beyond the normal amount, such as by hitting a rock or other obstruction.

- (1) Note. For devices for the same purpose on the exterior of the tire, see this class, subclasses 165 and 166.  
(2) Note. For devices for the same purpose separate from the tire and attached to the wheel, see Class 301, Land Vehicles: Wheels and Axles, subclasses 39.1+.

**159 Superimposed:**

This subclass is indented under subclass 155. The cushion means and the pneumatic means are superimposed upon each other radially of the wheel but are not united by vulcanization or equivalent means, and neither encloses the other.

- (1) Note. See this class, subclasses 175 and indented subclasses, and 187 and indented subclasses.

**160 Plungers:**

This subclass is indented under subclass 159. Independent tread elements project through a rigid element and are superimposed upon pneumatic means to reciprocate under load.

**161 Edge-secured cushion:**

This subclass is indented under subclass 159. The cushion means is located radially outwardly of the pneumatic means and its edges are secured to the wheel so that the cushion reciprocates in its middle zone only, under load.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
164, 327 and 345.1

**162 Guide flanges:**

This subclass is indented under subclass 159. The cushion means is located radially outwardly of the pneumatic feature and is guided by flanges so that it reciprocates under load. A plurality of cushion means may be present. The flanges may be on either the wheel or the cushion means. They hold the cushion against lateral displacement and may be the sole means securing the tread to the wheel.

**163 Radial stops:**

This subclass is indented under subclass 162. Stops are provided which limit the radial reciprocal movement of the cushion feature.

**164 Bolts or studs:**

This subclass is indented under subclass 163. Bolts or studs are provided to act as stops against radial or circumferential movement of the cushion means, or against both.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
161, for edge-secured cushion means.

**165 Integral:**

This subclass is indented under subclass 155. Inventions in which all elements of the tire proper are united by vulcanization or equivalent means, such as cementing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
158, for internal buffers.

**166 With removable inner tube:**

This subclass is indented under subclass 165. The integral tire is provided with, or obviously intended for use with, a removable inner tube,

and encloses at least the tread and side walls thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
158, for internal buffers.

**TIRES, RESILIENT, Armored:**

This subclass is indented under subclass 151. The tire is provided with devices protecting all or substantially all of the tread portion of the tire against wear or puncture. Where the device is sectional, the sections must substantially abut or be directly connected to each other by their own integral elements, or overlap, or be external and so thick as to raise the tire body above ordinary danger of puncture.

(1) Note. For analogous body armor, see Class 89, Ordnance, subclass 36.09 and see the notes thereto for other armor.

**167 Anti-skid:**

This subclass is indented under the unnumbered subclass, Armored. Devices protecting all or substantially all of the tread portion of the tire against wear or puncture, either integral with the tire or applied thereto, and so constructed and arranged as to tend to prevent slipping or skidding of the tire on the roadway, and performing the anti-skid function either alone or in combination with other elements. Anti-skid armor is necessarily wholly or partially external.

(1) Note. For similar anti-skid devices which do not fall within the definition of armor, see this class, subclass 208 and indented subclasses.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 98+ for a single or plural layer stock material product which is structurally defined (e.g., size or shape) and subclasses 221+ for such a product having a component or element which is structurally defined (e.g., size, arrangement, shape); and subclass 911 (a cross-reference art collection) for a product having a penetration resistant layer.

**168 Radial filaments and laminations:**  
This subclass is indented under subclass 167. The anti-skid armor comprises fibers, cords, wires or fabric extending radially or substantially radially of the tire as viewed in lateral section.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
212, for similar subject matter.

**169 Secured into casing:**  
This subclass is indented under subclass 167. The anti-skid armor, being external, is secured to the tire by means of rivets, bolts or the like extending into or through the tire casing, or a portion of the armor itself is embedded in the casing.

(1) Note. For anti-skid devices with embedded anti-skid for use with footwear, see Class 36, Boots, Shoes, and Leggings, subclass 59 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
210, 211 and 222, for similar subject matter.

**170 Detachable:**  
This subclass is indented under subclass 167. The anti-skid armor is detachable from the tire. This subclass consists principally of woven metal anti-skid armor.

**171 Linked mat:**  
This subclass is indented under subclass 170. The detachable anti-skid armor consists of either open or imperforate metal links connected to each other directly or by rods or cables in the nature of hinge pintles. The mat must extend for more than one link laterally of the wheel.

(1) Note. For the metal linked mat, see this class, subclass 201.

(2) Note. For detachable anti-skid armor consisting of links, and of single-link width, see this class, subclass 178 and indented subclasses.

**172 Tire secured:**  
This subclass is indented under subclass 171. The linked mat detachable anti-skid armor is secured to the wheel by intermediation of the tire, having no direct connection to the wheel, felly, or rim.

(1) Note. For the metal linked mat, see this class subclass 201.

(2) Note. For the securing means, see this class, subclasses 175, and indented subclasses 179, 182 and indented subclasses 187 and indented subclasses 191, 225 and indented subclasses, 233, 241 and 242.

**173 With circumferential band:**  
This subclass is indented under subclass 170. The detachable anti-skid armor comprises a nonsectional band which extends continuously about the major circumference of the tire. This band may be split. This subclass consists principally of such armor secured to the wheel, felly, or rim.

**174 Bound to felly:**  
This subclass is indented under subclass 173. The detachable anti-skid armor with circumferential band is secured to the wheel by means of a binding or strap around the felly.

(1) Note. For the securing means, see this class, subclasses 181, 186, 190, 220-230, 237, and 373.

**175 Tire secured:**  
This subclass is indented under subclass 173. The detachable anti-skid armor with circumferential band is secured to the wheel by intermediation of the tire, having no direct connection with the wheel, felly, or rim.

(1) Note. See this class, subclasses 159 and 187 and indented subclasses.

(2) Note. For the securing means, see this class, subclasses 172, 179, 182, 183, 187, 188, and 191.

**176 Inlaid tread:**

This subclass is indented under subclass 175. The detachable anti-skid armor comprises a band constituting a tread and wholly or partially inlaid in a groove or grooves in tread zone of the casing.

- (1) Note. For the securing means, see this class, subclasses 172, 179, 182, and indented subclasses 191, 225 and indented subclasses, 233 and 241.

**177 With securing rings:**

This subclass is indented under subclass 175. The tire secured detachable anti-skid armor with circumferential band is held to the tire by rings of smaller diameter than the tire tread, which rings are not secured to the wheel or tire but extend about the wheel at each side of the tread with the anti-skid armor attached thereto. The ring may be sectional but does not include any part of the armor. This subclass includes rings consisting entirely of chain.

- (1) Note. For the securing means, see this class, subclasses 172, 179, 184, 189, 191, 225 and indented subclasses, and 242.

**178 Sectional:**

This subclass is indented under subclass 170. The detachable anti-skid armor is sectional. The sections must substantially abut, or be directly connected to each other by their own integral elements, or overlap, or be so thick as to raise the tire above ordinary danger of puncture.

- (1) Note. For similar anti-skid devices which do not fall within the definition of armor, see this class, subclass 208 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

189, for secured rings.

**179 Tire secured:**

This subclass is indented under subclass 178. The sectional detachable anti-skid armor is held to the wheel by intermediation of the tire, having no direct connection with the wheel, felly or rim.

- (1) Note. For the securing means, see this class, subclasses 172, 175 and indented subclasses, 182 and indented subclasses 187 and indented subclasses, 191, 225 and indented subclasses, 233, 241, and 242.

- (2) Note. For similar structures where the armor is wholly metallic, see this class, subclass 182 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

191, for sectional external armor.

**180 Wholly metallic:**

This subclass is indented under subclass 178. The sectional detachable anti-skid armor itself comprises no material but metal. The securing means may be of other materials.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

190, for sectional external armor.

**181 Bound to felly:**

This subclass is indented under subclass 180. The wholly metallic sectional detachable anti-skid armor is secured to the wheel by means of a binding or strap around the felly.

- (1) Note. For the securing means, see this class, subclasses 174, 186, 190, 220-230, 237, and 373.

**182 Tire secured:**

This subclass is indented under subclass 179. The wholly metallic sectional detachable anti-skid armor is held to the wheel by intermediation of the tire, having no direct connection with the wheel, felly or rim.

- (1) Note. For the securing means, see this class, subclasses 172, 175, 176, 179, 183, 187, 188, 225, and indented subclasses, 233, and 241.

**183 Corner-connected sections:**

This subclass is indented under subclass 182. The wholly metallic sectional detachable anti-skid armor is bound to the tire (generally by inflation expansion of the tire within the armor), the adjacent armor sections being con-

ected to each other at, or close to, their corners only, to form a circular series of sections. The connection may be direct or by means of links.

- (1) Note. For the securing means, see this class, subclasses 179 and 191.

**184 With securing rings:**

This subclass is indented under subclass 182. The tire secured wholly metallic sectional detachable anti-skid armor is held to the tire by rings of smaller diameter than the tire tread, which rings are not secured to the wheel or tire, but extend about the wheel at each side of the tread with the anti-skid armor attached thereto. The ring may be sectional but does not include any part of the armor. This subclass includes rings consisting entirely of chain.

- (1) Note. For the securing means, see this class, subclasses 172, 177, 179, 189, 191, 225, and indented subclasses, and 242.

**185 External:**

This subclass is indented under the unnumbered subclass, Armored. External devices protecting all or substantially all of the tread portion of the tire against wear or puncture, either integral with the tire or applied.

- (1) Note. See also this class, subclass 53 and indented subclasses, for annular external armor which is rigid and forms an outer rim.

**185.1 Track for single wheel:**

This subclass is indented under subclass 185. Apparatus comprising either (a) one or more endless members having traction enhancing portions thereon, or (b) an endless member made up of a plurality of parts at least some of which having traction enhancing portions thereon, the member or members closely surrounding the tire about its periphery.

- (1) Note. A tire having a track or tread member as either an integral part thereof or otherwise being rigidly connected thereto even though separable therefrom is not deemed proper for classification here. Such devices are found in other

subclasses in (this class, Class 152), especially subclasses 170-184.

**186 Bound to felly:**

This subclass is indented under subclass 185. The external armor is secured to the wheel by means of a binding or strap around the felly.

- (1) Note. For the securing means, see this class, subclasses 174, 181, 190, 220-230, 237, and 373.

**187 Tire secured:**

This subclass is indented under subclass 185. The external armor is held to the wheel by intermediation of the tire, having no direct connection to the wheel, felly, or rim.

- (1) Note. See this class, subclasses 159 and 175 and indented subclasses.
- (2) Note. For the securing means, see this class, subclasses 172, 175, 179, 182, 183, 191, 225, and indented subclasses, 233, and 241.
- (3) Note. For sectional external armor, see this class, subclass 191.

**188 Inlaid tread:**

This subclass is indented under subclass 187. The tire secured external armor comprises a band constituting a tread and wholly or partially inlaid in a groove or grooves in the tread zone of the casing.

- (1) Note. For the securing means, see this class, subclasses 172, 176, 179, 182, and indented subclasses, and 191.

**189 With securing rings:**

This subclass is indented under subclass 187. The tire secured external armor is held to the tire by rings of smaller diameter than the tire tread which rings are not secured to the wheel or tire but extend about the wheel at each side of the tread with the armor attached thereto. The ring may be sectional but does not include any part of the armor. This subclass includes rings consisting entirely of chain.

- (1) Note. For the securing means, see this class, subclasses 172, 177, 179, 184,

191, 225, and indented subclasses, and 242.

**190 Sectional:**

This subclass is indented under subclass 185. The external armor is sectional. The sections must substantially abut, or be directly connected to each other by their own integral elements, or overlap.

- (1) Note. For sections so far separated as not to protect the entire tire tread, see this class, subclass 225 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

178, 180 and 181, for similar subject matter.

**191 Tire secured:**

This subclass is indented under subclass 190. The sectional external armor is secured to the wheel by intermediation of the tire, having no direct connection to the wheel, felly, or rim.

- (1) Note. For the securing means, see this class, subclasses 172, 175 and indented subclasses, 179, 182 and indented subclasses, 187 and indented subclasses, 225 and indented subclasses, 233, 241, and 242.

SEE OR SEARCH THIS CLASS, SUBCLASS:

179,

**192 Single tube tires internal:**

This subclass is indented under the unnumbered subclass, Armored. The tire armor is an element of a single tube tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

196, and 197 for armor embedded in casing construction.

**193 Metal:**

This subclass is indented under subclass 192. The single tube tire armor comprises metal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

198, 200, 201, 202, and 205 and indented subclasses.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 411.1-704 for a stock material product in the form of a plural layer web or sheet, but not structurally defined, and which may have a metal layer; and especially subclasses 457-472.3 for such a plural layer product including a metal layer next to a non-metal layer.

**194 Plates:**

This subclass is indented under subclass 193. The single tube tire armor comprises metal plates.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199, for casing embedded armor.

**195 Inner tube construction:**

This subclass is indented under the unnumbered subclass, Armored. The tire armor is an element of the inner tube construction. The armor may be embedded in the body of the tube or be secured to its surface.

- (1) Note. For reinforced inner tubes, see this class, subclasses 510+.

**196 Casing construction:**

This subclass is indented under the unnumbered subclass, Armored. The tire armor is an element of the casing construction. This subclass consists of armor secured to the inner surface of the casing, principally.

- (1) Note. If secured to the outer surface, see this class, subclass 185 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

192, and indented subclasses.

**197 Embedded:**

This subclass is indented under subclass 196. The armor is embedded in the body of the casing of the tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
192,

**198 Metal:**

This subclass is indented under subclass 197. The casing embedded armor comprises metal.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
193, 205 and 206 for pertinent subject matter.

SEE OR SEARCH CLASS:  
428, Stock Material or Miscellaneous Articles, subclass 411.1-704 for a stock material product in the form of a plural layer web or sheet, but not structurally defined, and which may have a metal layer; and especially subclasses 457-472.3 for such a plural layer product including a metal layer next to a nonmetal layer.

**199 Plates:**

This subclass is indented under subclass 198. The casing embedded armor comprises metal plates. These may extend from bead to bead.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
194, 205 and 206 for pertinent subject matter.

**200 Annular:**

This subclass is indented under subclass 198. The casing embedded armor comprises a flexible annular metal element extending about the major circumference of the tire. Such elements may be transversely split.

(1) Note. For rigid wheel encircling hands embedded within a pneumatic tire, see this class, subclass 57.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
193, and 207 for pertinent subject matter.

**201 Linked mat:**

This subclass is indented under subclass 198. The casing embedded armor comprises either open or imperforate metal links connected to each other either directly or by rods or cables in the nature of hinge pintles. The mat must extend for more than one link laterally of the wheel.

(1) Note. For the metal linked mat, see this class, subclasses 171 and 172.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
193, and 205 for pertinent subject matter.

**202 Woven:**

This subclass is indented under subclass 198. The casing embedded armor is composed of woven fabric comprising metal strands.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
193, and 205 for pertinent subject matter.

**203 Interliners:**

This subclass is indented under the unnumbered subclass, Armored. The tire armor is a readily removable separate annular element extending about the major circumference of the tire and interposed between the inner tube and casing. This is generally known as a "liner" or "interliner".

(1) Note. For such armor permanently secured to the outer surface of the inner tube, see this class, subclass 195.

(2) Note. For such armor permanently secured to the inner surface of the casing, see this class, subclass 196.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
371, and indented subclasses.

**204 Cotton, fabric, or rubber:**

This subclass is indented under subclass 203. The tire armoring interliner is composed of cotton fabric or rubber or both. Since cotton fabric is conventional in pneumatic tires, this subclass includes such patents as mention fabric without specifying the material.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
371, and indented subclasses.
- 205 Metal:**  
This subclass is indented under subclass 203. The interliner comprises metal as an armoring element. This subclass consists of plate armor, principally.
- (1) Note. See this class, subclasses 193, 194, 198, 199, 201, and 202.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
371, and indented subclasses.
- SEE OR SEARCH CLASS:  
428, Stock Material or Miscellaneous Articles, subclasses 411+ for a stock material product in the form of a plural layer web or sheet, but not structurally defined, and which may have a metal layer; and especially subclasses 457+ for such a plural layer product including a metal layer next to a non-metal layer.
- 206 Scale armor:**  
This subclass is indented under subclass 205. The tire armoring metal interliner comprises plates overlapping in fish-scale fashion, either longitudinally or laterally.
- (1) Note. See this class, subclasses 194 and 199.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
371, and indented subclasses.
- 207 Annular:**  
This subclass is indented under subclass 205. The tire armoring interliner comprises a metal annulus. This may be split.
- (1) Note. See this class, subclasses 193 and 200.
- 208 Anti-skid devices:**  
This subclass is indented under subclass 151. Devices arranged upon a tire so as to give with the flexure of the tire and so constructed and arranged as to tend to prevent slipping or skidding of the tire on the roadway.
- (1) Note. For anti-skid devices in combination with or forming tire armor, see this class, subclass 167 and indented subclasses. See the definition of Tires, resilient, Armored, following subclass 166.
- (2) Note. For anti-skid devices for use with footwear, see Class 36, Boots, Shoes, and Leggings, subclasses 7.6, 7.7, and 59 and indented subclasses.
- (3) Note. For anti-slipping pulleys, see Class 474, Endless Belt Power Transmission Systems or Components, particularly subclasses 177+ and 190+ for pulleys with a material on the belt-engaging surface which may be effective to reduce slippage.
- (4) Note. For anti-skid devices attached to portions of the vehicle which do not rotate with the wheel, see Class 188, Brakes, subclasses 4, 5 and 6.
- (5) Note. For traction mats which facilitate extraction of motor driven vehicles when stalled in mud or sand, see Class 238, Railways: Surface Track, subclass 14.
- (6) Note. For anti-skid devices which do not give with the flexure of the tire, see Class 301, Land Vehicles: Wheels and Axles, subclasses 41.1+.
- (7) Note. See Class 305, Wheel Substitutes for Land Vehicles, appropriate subclasses for flexible tracks for land vehicles. Class 305 takes devices where the sole specific disclosure or a claim is directed to an anti-skid device which is adapted to be trained about a pair of longitudinally spaced resilient tires and intended to operate as a flexible track apparatus.
- (8) Note. See Class 520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 152 for a composition containing a synthetic resin or natural rubber having utility as a friction element for automobiles,

trains, trailers, roller skates, skateboards, or other wheeled vehicles or to processes of preparing said composition.

**209.1 Tread:**

This subclass is indented under subclass 208. Devices wherein the tread of the tire constitutes the anti-skid device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

324, 325, for cushion tires having recesses which are inherently anti-skid. Recesses in the tire tread, primarily to increase tire resilience, are in subclasses 324 and 325.

SEE OR SEARCH CLASS:

D12, Transportation, subclasses 500 through 603 for ornamental designs for tire tread.

**209.2 For controlling noise by varying design cycle (e.g., specified pitch ratio, pitch sequence, etc.):**

This subclass is indented under subclass 209.1. Tread having at least two different pitches, for regulating noise generated when a tire surface contacts a road surface.

**209.3 Having varying tread characteristic (e.g., groove depth, groove angle, etc.) other than design cycle**

This subclass is indented under subclass 209.2. Tread having a tread characteristic varying in proportion to pitch.

**209.4 Containing randomly dispersed short fibers or anti-skid granules:**

This subclass is indented under subclass 209.1. Tread having randomly dispersed short fibers or anti-skid granules throughout at least the upper tread surface.

- (1) Note. Granules may be disclosed as particles, short fibers, or anti-skid granules. Fillers such as carbon black and silica are not considered proper for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

210, for anti-skid elements, nonrandomly embedded therein or anti-skid ele-

ments, per se, when it is disclosed that they are for use in a tire.

**209.5 Having tread sections (e.g., base-cap, etc.) containing different specified physio-chemical properties (e.g., hysteresis, modulus, hardness, etc.) or compositions:**

This subclass is indented under subclass 209.1. Tread having at least one section with specified physio-chemical properties or compositions which are different from specified physio-chemical properties or compositions of another section.

**209.6 Including retread or precured tread section:**

This subclass is indented under subclass 209.5. Tread wherein at least one section is precured or is retread.

**209.7 Including foam section:**

This subclass is indented under subclass 209.5. Tread wherein at least one section has randomly dispersed pores or voids.

**209.8 Having asymmetric tread pattern:**

This subclass is indented under subclass 209.1. Tread having a pattern on one side of the equatorial plane of a tire which is not a mirror image of the tread pattern on the other side of the equatorial plane of said tire.

**209.9 Characterized by different groove widths:**

This subclass is indented under subclass 209.8. Tread having groove widths on one side of the equatorial plane of a tire that are dissimilar to groove widths on the other side of the equatorial plane of said tire.

**209.11 For sidewall-running tires (e.g., unicycle, motorcycle, bicycle, etc.):**

This subclass is indented under subclass 209.1. Tread which, when measured laterally, is identified as the axial distance across a tire, below the opposite shoulders, to include at least a portion of said tire's sidewall.

- (1) Note. This subclass contains treads which wrap laterally around a tire, below the opposing shoulders of said tire, to include at least a portion of said tire's sidewall.

**209.12 Containing lugs having or appearing to have net to gross ratios of 35 percent or less (e.g., farm equipment, tractor tire, etc.):**

This subclass is indented under subclass 209.1. Tread having or appearing to have relatively few extremely large blocks (i.e., lugs) arranged across a tire surface such that a ratio of the area of the large block surface (i.e., net) to the overall tire surface area (i.e., gross) is equal to or less than 0.35 to 1.0 or a net to gross of 35% or less.

- (1) Note. In some prior art, the net to gross ratios are not specified. In these situations, the description or drawings are reviewed to determine if the criteria hereinabove set forth seem to have been met. If the criteria seem met, placement will be proper for this subclass.

**209.13 Having circumferential rib at or crossing equatorial plane:**

This subclass is indented under subclass 209.12. Tread having a circumferential rib at or crossing the equatorial plane of a tire.

**209.14 Having tire tread profile defined by diverse radii of curvature:**

This subclass is indented under subclass 209.1. Tread having a tire surface curvature represented by radii which have different magnitudes or origins.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
324, 325, and 454, for cushion tires having external shape characteristics other than anti-skid tread surface tires.

**209.15 Characterized by shape of upper surface of tread element (e.g., block with upper convex surface, etc.):**

This subclass is indented under subclass 209.1. Tread having the shape of the upper surface of a tread element (i.e., surface of tread element intended to contact road) specified.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
209.14, for tread elements having their upper surface defined only by the radius of curvature or the tread.

**209.16 Having specified tread shoulder structure:**

This subclass is indented under subclass 209.1. Tread having a specified structure for an outside portion of the tread which lies below the tread surface and above the beginning of a sidewall section of a tire (i.e., shoulder).

**209.17 Having isolated holes or suction cups:**

This subclass is indented under subclass 209.1. Tread having openings or hollow cavities completely surrounded by at least one tread element.

**209.18 Having groove or sipe with specified dimension or structure therewithin:**

This subclass is indented under subclass 209.1. Tread having recesses identified as grooves, incisions, channels, calfs, narrow slits, cuts, or kerfs with specified dimensions (e.g., width, wall angle, depth, etc.) or characteristics of within-groove structure.

**209.19 Protrusion from bottom and spaced from both walls (e.g., pebble ejector, etc.):**

This subclass is indented under subclass 209.18. Tread having an element protruding from the bottom and spaced from both walls of the groove or sipe.

- (1) Note. Documents placed in this subclass have a unique anti-skid tread design feature useful as pebble ejectors.

**209.21 Protrusion from wall and spaced from the opposite wall:**

This subclass is indented under subclass 209.18. Tread having an element projecting from one wall and spaced from the opposing wall of the groove or sipe.

**209.22 Protrusion bridging between walls (e.g., tie bar, etc.):**

This subclass is indented under subclass 209.18. Tread having an element projecting from one wall, extending laterally and connecting to the opposing wall of the groove or sipe.

- (1) Note. A tie bar is considered to be a protrusion which is connected to both sidewalls of a groove or sipe.

**209.23 Both walls inclined in same direction:**

This subclass is indented under subclass 209.18. Tread having opposing walls of the groove or sipe angled in the same direction.

**209.24 Having angle of inclination of one wall different from that of opposite wall:**

This subclass is indented under subclass 209.18. Tread wherein opposing walls of the groove or sipe have different angles of inclination.

**209.25 Having grooves or sipes with different specified depths:**

This subclass is indented under subclass 209.18. Tread wherein at least one groove or sipe has a depth different from the depth of a second groove or sipe depth.

**209.26 Having circumferential groove width at least 10% of tread width:**

This subclass is indented under subclass 209.18. Tread wherein the groove is circumferential wherein the width of said groove measures laterally at least 10% across the surface of a tire. (e.g., aquachannel, etc.)

**209.27 Having continuous circumferential narrow width groove (i.e., less than 5mm.):**

This subclass is indented under subclass 209.18. Tread wherein the groove is circumferential and its width from wall to opposite wall measures less than 5mm.

**209.28 Having directional two dimensional pattern (e.g., "V" shape, etc.):**

This subclass is indented under subclass 209.1. Tread having lateral grooves on each side of the tire equator which converge at an angle to form a "v" shape.

**210 With embedded anti-skid elements:**

This subclass is indented under subclass 209.1. Tread wherein the tire constitutes an anti-skid device by virtue of anti-skid elements embedded therein.

- (1) Note. This subclass includes anti-skid elements, per se, when it is disclosed that they are for use in a tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

169, for armored tires wherein armor is embedded in the casing.

209.4, for treads containing short fibers or anti-skid granules which are randomly dispersed at least throughout the upper portion of the tread

222, for anti-skid devices, per se, consisting of flexible straps or cords extending across the tread of the tire which contain metal projections or combined chains to prevent slipping.

SEE OR SEARCH CLASS:

36, Boots, Shoes, and Leggings, subclasses 59 through 67 for anti-skid devices with embedded anti-skid elements for use with footwear.

168, Farriery, subclasses 29 through 43 for horseshoe calks.

**211 Flush with tread:**

This subclass is indented under subclass 210. The tread of the tire constitutes an anti-skid device by virtue of anti-skid elements embedded therein and flush with the surface thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

169 and 222, for similar subject matter.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, subclasses 36, for anti-skid compositions.

**212 Radial filaments and laminations:**

This subclass is indented under subclass 210. The tread of the tire constitutes an anti-skid device by virtue of anti-skid elements embedded therein and consisting of fibers, cords, wires, or fabric extending radially or substantially radially of the tire as viewed in lateral section.

SEE OR SEARCH THIS CLASS, SUBCLASS:

168, for similar subject matter.

**213 Applying and removing devices:**

This subclass is indented under subclass 208. Devices embodied in anti-skid devices to facilitate their mounting upon or removal from the tire, or for carrying such anti-skid devices upon the vehicle in position for ready mounting upon the tire, or both.

**SEE OR SEARCH CLASS:**

- 81, Tool, subclass 15.8 for separate tools to apply chains.  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 199 through 263 for portable implements or apparatus for tensioning flexible material (other than tire chains) from which the implements or apparatus are detached after tensioning.

**214 Vehicle carried:**

This subclass is indented under subclass 213. The applying and removing device for anti-skid devices is carried upon the vehicle.

- (1) Note. For article carriers, see Class 224, Package and Article Carriers, subclasses 400+.

**SEE OR SEARCH CLASS:**

- 242, Winding, Tensioning, or Guiding, subclasses 398+ for a reel carrier.

**215 Running board carried:**

This subclass is indented under subclass 214. The applying and removing devices for anti-skid devices are carried upon the running board of the vehicle.

**216 Wheel carried:**

This subclass is indented under subclass 214. The applying and removing devices for the anti-skid devices are carried solely upon the wheel and rotate therewith.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 214, for such devices supported partly by the wheel and partly by the vehicle body or running board.

**217 Tighteners:**

This subclass is indented under subclass 208. The anti-skid device is secured in place by means including a spring, constantly tending to bind the anti-skid device down upon the tire. This subclass takes such tensioning devices, per se, when specially adapted to this purpose, where no other securing means is combined therewith.

- (1) Note. For the securing means without the continuing tension feature, in combination with the anti-skid device, see this class, subclasses 233-242.  
(2) Note. For securing means, per se, with combined tightening functions, without the continuing tension feature, see appropriate subclasses in Class 24, Buckles, Buttons, Clasps, etc., especially, subclasses 68-70.  
(3) Note. For tightening devices for use in application of the anti-skid device to the tire, and not having the continuing tension feature, see Class 81, Tools, subclass 15.8 for tools to apply chains.  
(4) Note. For such tensioning devices, per se, of more or less general application, see Class 267, Spring Devices, subclass 69 and indented subclasses.

**218 Radial:**

This subclass is indented under subclass 217. The anti-skid device tightener exerts its force upon the device radially of the wheel.

**219 Circumferential:**

This subclass is indented under subclass 217. The anti-skid device tightener exerts its force upon the device circumferentially of the wheel.

**220 Plural tire:**

This subclass is indented under subclass 208. The anti-skid device is designed for use upon two or more tires mounted side by side.

**221 Flexible straps or cords:**

This subclass is indented under subclass 208. The anti-skid device comprises anti-skid elements consisting of flexible straps or cords extending across the tread of the tire.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
178, 179, 190, 191, and 373, for similar subject matter.
- 222 With metal anti-skid:**  
This subclass is indented under subclass 221. The flexible straps or cords of the anti-skid device have metal projections or combined chains to prevent slipping.
- (1) Note. For the metal projections, see this class, subclasses 169 and 210.
- (2) Note. For anti-skid devices with embedded anti-skid for use with footwear, see Class 36, Boots, Shoes, and Leggings, subclass 59 and indented subclasses.
- 223 Combined cross chains and plates or bars:**  
This subclass is indented under subclass 208. The anti-skid devices comprise anti-skid elements consisting of chains, and additional such elements consisting of plates or bars. Each chain consists of a connected series of links extending across the tread of the tire, and the plates or bars extend across or substantially across the tread of the tire.
- 224 Superimposed:**  
This subclass is indented under subclass 223. The combined cross chains and plates or bars in the anti-skid device are positioned one upon the other.
- 225 Plate or bar type:**  
This subclass is indented under subclass 208. The anti-skid device comprises anti-skid elements consisting of plates or bars extending across or substantially across the tread of the tire.
- (1) Note. Where the plates are so small as to be in the nature of links, see this class, subclass 244.
- (2) Note. For securing devices, see this class, subclasses 233, 241 and 242, and notes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 226 With traction lugs:**  
This subclass is indented under subclass 225. The plates or bars of the anti-skid device are provided with projections to prevent slipping.
- (1) Note. For similar projections on horse-shoes, see Class 168, Farriery, appropriate subclasses.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 227 Flanges:**  
This subclass is indented under subclass 226. The traction lugs on the plate or bar type anti-skid devices are projecting edges or ribs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 228 Integral:**  
This subclass is indented under subclass 227. The flanges serving as traction lugs on the plate or bar type anti-skid device are integral therewith.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 229 Calks:**  
This subclass is indented under subclass 226. The traction lugs on the plate or bar type anti-skid devices are symmetrical and taper toward a point, substantially.
- (1) Note. For horseshoe calks, see Class 168, Farriery, appropriate subclasses.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 230 Integral:**  
This subclass is indented under subclass 229. The calks serving as traction lugs on the plate or bar type anti-skid device are integral therewith.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for anti-skid devices designed for use on two or more tires mounted side by side.
- 231 Cross chain type:**  
This subclass is indented under subclass 208. The anti-skid device comprises anti-skid elements consisting of a connected series of links extending across the tread of the tire.
- (1) Note. See Class 59, Chain, Staple, and Horseshoe Making, appropriate subclasses.
- 232 Independent sections:**  
This subclass is indented under subclass 231. The cross chain type anti-skid devices are of less than wheel encircling dimensions and are secured to the wheel independently of each other. Such devices may be used singly upon the wheel.
- (1) Note. For chain arrangement, see this class, subclass 217 and indented subclasses, and 239.
- (2) Note. See Class 59, Chain, Staple, and Horseshoe Making, appropriate subclasses.
- SEE OR SEARCH CLASS:  
301, Land Vehicles: Wheels and Axles, subclass 42 for traction-improving chains.
- 233 Securing devices:**  
This subclass is indented under subclass 232. Devices for securing independent section, cross chain type, anti-skid devices to the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
172, 175, 176, 179, 182, 183, 187, 188, 191, 220-230, and 373 for similar subject matter.
- 234 Felly and spoke:**  
This subclass is indented under subclass 233. The securing device for the independent section, cross chain type, anti-skid device is secured to the wheel felly and spoke.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, through 230 for similar subject matter.
- 235 Spoke clamped:**  
This subclass is indented under subclass 234. The felly and spoke securing device for the independent section, cross-chain type, anti-skid device is clamped to a spoke.
- (1) Note. For clamping devices, per se, see Class 24, Buckles, Buttons, Clasps, etc., subclasses 455+.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, through 230 for similar subject matter.
- 236 Felly:**  
This subclass is indented under subclass 233. The independent section, cross chain type, anti-skid device is secured only to the felly.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, through 230 for similar subject matter.
- 237 Bound to felly:**  
This subclass is indented under subclass 236. The independent section, cross chain type, anti-skid device is secured to the wheel by means passing around the felly and without the aid of bolts, screws or the like secured to any part of the wheel.
- (1) Note. For the securing means, see this class, subclasses 174, 181, 186, 220-230, and 373.

**238 Spoke:**  
This subclass is indented under subclass 233. The independent section, cross chain type, anti-skid devices are secured only to the spoke of the wheel.

- (1) Note. For clamping devices per se, see Class 24, Buckles, Buttons, Clasps, etc., subclasses 455+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

220, through 230 for similar subject matter.

**239 Annular:**  
This subclass is indented under subclass 231. The cross chain anti-skid device is a unit extending about the wheel when in assembled relation thereto and which may remain a unit during its removal from the wheel. This subclass is largely composed of devices wherein the cross chain tread elements are disposed other than in the conventional straight across manner, or are arranged in specifically designed groups, or both.

- (1) Note. For the chain arrangement, see this class, subclass 217 and indented subclasses, 231 and 232.

**240 With side anti-skid elements:**  
This subclass is indented under subclass 239. The annular, cross chain type, anti-skid device is provided with anti-skid elements at its sides to prevent lateral skidding or to engage in deep mud.

SEE OR SEARCH THIS CLASS, SUBCLASS:

232, for devices with independent sections.

**241 Securing devices:**  
This subclass is indented under subclass 239. The annular, cross chain type, anti-skid device in combination with means for maintaining the anti-skid device in operative position, or such means, per se, when specially adapted to this purpose.

- (1) Note. For securing devices, per se, see Class 24, Buckles, Buttons, Clasps, etc., especially subclasses 68, 69, 70, 116,

598.1, and 698.1 and indented subclasses.

- (2) Note. For chain links used as securing devices, see Class 59, Chain, Staple, and Horseshoe Making, especially subclass 84 and indented subclasses, and subclass 93.
- (3) Note. For turnbuckles and other adjustable length securing devices, see Class 403, Joints and Connections, subclasses 43+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

174, 175, 179, 182, 183, 187, 188, 191, 225, 230-233, 257, and 323 for similar subject matter.

**242 Securing rings:**  
This subclass is indented under subclass 241. Devices wherein the annular, cross chain type, anti-skid device is held to the tire by rings of smaller diameter than the tire tread, which rings are not secured to the wheel or tire, and which extend about the wheel at each side of the tire with the cross chains attached thereto. This subclass includes rings consisting entirely of chain.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, 177, 179, 184, 189, 191, and 225-230 for similar subject matter.

**243 Modified links:**  
This subclass is indented under subclass 231. The cross chains of the anti-skid device comprise a link or links differing from the usual or conventional link.

- (1) Note. Patents are classified herein rather than in Class 59, Chain, Staple, and Horseshoe Making, where the inventor states that the device may be used for anti-skid purposes and it is clear that the chain or link is modified to adapt it particularly for such use.

SEE OR SEARCH THIS CLASS, SUBCLASS:

171, 172, 232, 239, and 240 for similar subject matter.

- 244 Solid:**  
This subclass is indented under subclass 243. The cross chains of the anti-skid device comprise a link or links, the ground contacting surface of which is substantially unbroken throughout. These links are in the nature of plates.
- (1) Note. Where the plates are large enough to extend across or substantially across the tread of the tire, see this class, subclass 225 and indented subclasses.
- (2) Note. See Class 59, Chain, Staple, and Horseshoe Making, appropriate subclasses.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
171, 172, 232, 239, and 240 for similar subject matter.
- 245 With protectors:**  
This subclass is indented under subclass 243. The modified links of the cross chains are provided with separately formed devices tending to protect them against wear.
- (1) Note. See Class 59, Chain, Staple, and Horseshoe Making, appropriate subclasses.
- 246 Cushion:**  
This subclass is indented under subclass 151. The tires are resilient and absorb road shocks by other than pneumatic means.
- (1) Note. Tread surfaces of wood have been regarded as resilient, and placed in this class.
- (2) Note. For cushion tires specially adapted for use with railway vehicles, see Class 295, Railway Wheels, and Axles, subclasses 11+.
- SEE OR SEARCH CLASS:  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 112+ and 404 for processes and apparatus for making nonpneumatic cushion tires.
- 247 Metallic springs:**  
This subclass is indented under subclass 246. The tire cushions the wheel by means of metallic springs. Such springs may be combined with rubber.
- (1) Note. For combined pneumatic and metallic spring tires, see this class, subclass 156.
- 248 Tubular:**  
This subclass is indented under subclass 247. The springs consist of one or more tubular annuli extending about the wheel. These may be sectional. The tube as a whole may have apertures or slots or notches therein.
- 249 Integral:**  
This subclass is indented under subclass 248. Where the tire is a single metallic tubular annulus consisting of an integral element. The tube may be open at its rim zone and may have slots or notches therein.
- 250 Woven:**  
This subclass is indented under subclass 248. The metallic spring tire consists of one or more woven tubes. The tube may be open at the rim zone. Either warp or weft may be nonmetallic.
- 251 Wheel encircling band:**  
This subclass is indented under subclass 247. Devices in which one or more flexible spring bands extend about the wheel in spaced relation thereto. The bands may be composed of connected sections. A mere wire is considered to be a band, but where elements do no more than connect the outer ends of springs, they are not regarded as bands; nor is the provision of overlapping sections not connected to each other regarded as a band.
- 252 With supporting spring:**  
This subclass is indented under subclass 251. The flexible wheel encircling band of ... is supported by metal springs.
- (1) Note. For flexible wheel encircling bands supported by an annular solid rubber element, see this class, subclass 302; for such bands supported by rubber sections, see subclass 303; for such bands described or claimed as armor and sup-

ported by an annular solid rubber element or by a pneumatic element, see subclass 185 and indented subclasses; for such bands built into the carcass of a pneumatic tire, see subclass 200.

- (2) Note. For rigid wheel encircling bands supported by metal, rubber, or pneumatic resilient elements, or enclosed by or embedded within a pneumatic tire construction, see this class, subclass 17 and indented subclasses, even though the device is built into the form and semblance of a tire.
- (3) Note. A thin flat metallic band spaced from the rim of a conventional wheel is assumed to be flexible, in the absence of positive evidence that it is rigid.

**253 Leaf:**  
This subclass is indented under subclass 252. The flexible wheel encircling band is supported by leaf springs.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
270, for cushioning springs that are leaf springs.

**254 Circumferentially extending:**  
This subclass is indented under subclass 253. The leaf springs extend circumferentially of the wheel. This subclass includes springs having no positive securing means, being held in place by devices such as flanges, enclosures or encircling bands. This subclass also includes continuous endless leaf springs, however secured.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
271, for similar subject matter.

**255 Center secured:**  
This subclass is indented under subclass 254. The circumferentially extending leaf springs are secured at or adjacent their center. This subclass includes leaf springs which are additionally secured at their ends.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
272, for similar subject matter.

**256 End secured:**  
This subclass is indented under subclass 254. The circumferentially extending leaf springs are secured at their ends only.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
255 and 273, for similar subject matter.

**257 Single end:**  
This subclass is indented under subclass 256. The leaf springs are secured at one end only.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
255, 256 and 274, for similar subject matter.

**258 Transverse:**  
This subclass is indented under subclass 253. The leaf springs extend transversely of the plane of the wheel.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
275 and 276, for similar subject matter.

**259 Enclosed:**  
This subclass is indented under subclass 258. The transverse leaf springs are completely enclosed in an enclosure common to all. This enclosure may consist of a plurality of elements.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
277 and 279, for similar subject matter.

**260 Rim secured:**  
This subclass is indented under subclass 258. The transverse leaf springs are secured to a rim by means other than an enclosure.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
259, and 280 through 283, for similar subject matter.

**261 Coil:**  
This subclass is indented under subclass 252. The flexible wheel encircling band is supported by coil springs.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
284, through 288 for similar subject matter.
- 262 Radial:**  
This subclass is indented under subclass 261. The coil springs extend radially substantially in the plane of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
289, through 292 for similar subject matter.
- 263 Enclosed:**  
This subclass is indented under subclass 262. Devices in which the flexible wheel encircling band, the band-supporting radial coil springs, and all radially reciprocating elements except the tread are completely enclosed in an enclosure common to all. This enclosure may consist of a plurality of elements.
- (1) Note. For similar devices without the wheel encircling band, having unconnected shoes between the springs and enclosure, whether the shoes are overlapped or not, see this class, subclass 293.
- 264 Annular guide flange:**  
This subclass is indented under subclass 263. The enclosure about the radial coil springs comprises a tread which is a separate element free to move radially and guided by annular flanges extending about the wheel. These flanges may be on either the wheel or the tread. They hold the tread against lateral displacement and may be the sole means securing the tread to the wheel.
- (1) Note. For similar devices without the wheel encircling band, having unconnected shoes between the springs and enclosure, whether the shoes are overlapped or not, see this class, subclasses 294 and 295.
- 265 Integral enclosure:**  
This subclass is indented under subclass 263. The enclosure about the radial coil springs consist of a single element.
- (1) Note. For similar devices without the wheel encircling band, having unconnected shoes between the springs and enclosure, whether the shoes are overlapped or not, see this class, subclasses 296 and 297.
- 266 Arcuate interior surface:**  
This subclass is indented under subclass 265. The interior surface of the integral enclosure about the radial coil springs presents an arcuate cross-section throughout, except that there may be some departure from the arcuate in providing wheel securing means adjacent the rim.
- (1) Note. For similar devices without the wheel encircling band, having unconnected shoes between the springs and enclosure whether the shoes are overlapping or not, see this class, subclasses 298 and 299.
- 267 Enclosed:**  
This subclass is indented under subclass 251. Inventions in which the flexible spring bands are completely encased in an enclosure common to all.
- 268 Integral enclosure:**  
This subclass is indented under subclass 267. The enclosure about the flexible spring band consists of a single element.
- 269 Arcuate interior surface:**  
This subclass is indented under subclass 268. The interior surface of the integral enclosure about the flexible spring band presents an arcuate cross-section throughout, except that there may be some departure from the arcuate in providing wheel securing means adjacent the rim.
- 270 Leaf:**  
This subclass is indented under subclass 247. The cushioning springs are leaf springs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
253, for flexible wheel encircling bands supported by leaf springs.

- 271      Circumferentially extending:**  
This subclass is indented under subclass 270. The cushioning springs are leaf springs arranged so that they extend in the direction of the circumference of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
254,      for similar subject matter.
- 272      Center secured:**  
This subclass is indented under subclass 271. The circumferentially extending cushioning springs are leaf springs secured at or adjacent their center. This subclass includes leaf springs which are additionally secured at their ends.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
255,      for similar subject matter.
- 273      End secured:**  
This subclass is indented under subclass 271. The circumferentially extending leaf springs are secured at their ends only.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
256,      and 272 for similar subject matter.
- 274      Single end:**  
This subclass is indented under subclass 273. The circumferentially extending leaf springs are secured at one end only.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
257,      for similar subject matter.
- 275      Transverse:**  
This subclass is indented under subclass 270. The cushioning springs are leaf springs extending transversely of the plane of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
258,      for similar subject matter.
- 276      Embedded:**  
This subclass is indented under subclass 275. The transversely extending leaf springs are embedded in cooperating structure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
258,      for similar subject matter.
- 277      Enclosed:**  
This subclass is indented under subclass 275. The transversely extending leaf springs are completely enclosed in an enclosure common to all. This enclosure may consist of a plurality of elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259,      for similar subject matter.
- 278      Rim secured:**  
This subclass is indented under subclass 277. The enclosed transversely extending leaf springs are secured to a rim by means other than the enclosure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259,      for similar subject matter.
- 279      Retaining ring secured:**  
This subclass is indented under subclass 278. The enclosed transversely extending leaf springs are secured to the wheel by a circumferential ring. The ring may be either inside or outside of the enclosure.
- (1) Note. For securing rings to bind the tire on the rim, see this class, subclasses 152, 307, 388 and indented subclasses, and 399.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259,      262 and 283 for similar subject matter.
- 280      Rim secured:**  
This subclass is indented under subclass 275. The transversely extending springs are secured to a rim by means other than an enclosure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259,      260 and 278 for similar subject matter.

- 281 Rim flange engagement:**  
This subclass is indented under subclass 280. The rim secured transversely extending leaf springs are secured to the rim by engagement with flanges thereon.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259, 260 and 278 for similar subject matter.
- 282 Radial securing means:**  
This subclass is indented under subclass 280. The rim secured transversely extending leaf springs are secured to the rim by means other than flanges, extending radially in a plane or planes parallel to the plane of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259, 260 and 278 for similar subject matter.
- 283 Retaining ring secured:**  
This subclass is indented under subclass 280. The rim secured transversely extending leaf springs are secured in place by a circumferential ring or rings. The rings may be either inside or outside the tire.
- (1) Note. For securing rings to bind the tire on the rim, see this class, subclasses 152, 307, 388 and indented subclasses, and 399.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
259, 260 and 278 for similar subject matter.
- 284 Coil:**  
This subclass is indented under subclass 247. The cushioning springs are coil springs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261, for similar subject matter.
- 285 Circumferential:**  
This subclass is indented under subclass 284. The cushioning springs are coil springs, one or more of which extends about the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261, for similar subject matter.
- 286 Embedded:**  
This subclass is indented under subclass 285. The circumferentially extending coil springs are embedded in cooperating structure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261, for similar subject matter.
- 287 Enclosed:**  
This subclass is indented under subclass 285. All the circumferentially extending coil springs are completely enclosed in an enclosure common to all. This enclosure may consist of a plurality of elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261, for similar subject matter.
- 288 Arcuate interior surface:**  
This subclass is indented under subclass 287. The interior surface of the enclosure about the circumferentially extending coil springs presents an arcuate cross section throughout, except that there may be some departure from the arcuate in providing wheel securing means adjacent the rim.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261, for similar subject matter.
- 289 Radial:**  
This subclass is indented under subclass 284. The cushioning springs are coil springs extending radially substantially in the plane of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
262, for similar subject matter.
- 290 Sectional tire units:**  
This subclass is indented under subclass 289. The tire consists of individual radially extending coil spring cushioning units each forming a section of the tire and acting independently of the others.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262, for similar subject matter.  
292 and 295, wherein tread elements coact with each other, either directly or through the springs.

**291 With plungers:**

This subclass is indented under subclass 290. Inventions having radially extending spring pressed plungers each with a shank extending through a wall of the tire and rim assembly and each being part of a tire section acting independently of other tire sections. The shank extends outwardly to carry or constitute a tread section and may also extend inwardly through the rim.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262, for similar subject matter.  
292, for spring pressed plungers carrying tread sections which coact with each other.

**292 With plungers:**

This subclass is indented under subclass 289. Inventions having radially extending spring pressed plungers, each with a shank extending through a wall of the tire and rim assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262 and 291, for similar subject matter.

**293 Enclosed:**

This subclass is indented under subclass 289. The radial coil springs and all radially reciprocating elements except the tire tread, are completely enclosed in an enclosure common to all. This enclosure may consist of a plurality of elements.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

263, for similar subject matter.

**294 Annular guide flange:**

This subclass is indented under subclass 293. The enclosure about the radial coil springs comprises a tire tread which is a separate element free to move radially and guided by annular flanges extending about the wheel. These

flanges may be on either the wheel or tread. They hold the tread against lateral displacement and may be the sole means securing the tread to the wheel. This subclass includes unconnected shoes between the springs and enclosure and these shoes may overlap.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

162 through 164 and 264, for similar subject matter.

**295 Sectional tread:**

This subclass is indented under subclass 294. The flange guided tire tread comprised in the enclosure about the radial coil springs is sectional and the tread elements coact with each other either directly or through the springs. Compare ... of this class wherein there is no such coaction. This subclass may have unconnected shoes between the springs and enclosure, and these shoes may overlap.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

264, for similar subject matter.

**296 Integral enclosure:**

This subclass is indented under subclass 293. The enclosure about the radial coil springs consists of a single unit. This subclass may have unconnected shoes between the springs and enclosure and these shoes may overlap.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

265, for similar subject matter.

**297 With nonmetallic band:**

This subclass is indented under subclass 296. Devices having a nonmetallic band encircling the radial coil springs inside the integral enclosure. This band may be sectional.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

265, for similar subject matter.

**298 Arcuate interior surface:**

This subclass is indented under subclass 296. The interior surface of the integral enclosure about the radial coil springs presents an arcuate cross section throughout, except that there may be some departure from the arcuate in provid-

- ing wheel securing means adjacent the rim. This subclass may have unconnected shoes between the springs and enclosure, and these shoes may overlap.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
266, for similar subject matter.
- 299 With nonmetallic band:**  
This subclass is indented under subclass 298. Devices in which a nonmetallic band encircles the radial coil springs inside the integral arcuate-surfaced enclosure. This band may be sectional.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
266, for similar subject matter.
- 300 Sectional:**  
This subclass is indented under subclass 246. The cushion tires are nonmetallic and consist of sections either abutting each other or otherwise so constructed and arranged as to provide continuous or substantially continuous smooth rolling road contact. This group includes tires having sectional tread surfaces of wood.
- (1) Note. For sectional rigid tires and for resilient anti-skid lugs on rigid tires, see Class 301, Land Vehicles: Wheels and Axles, appropriate subclasses.
- 301 Annular:**  
This subclass is indented under subclass 300. The sections extend annularly about the wheel.
- (1) Note. For such sections secured together by vulcanization or similar means, see this class, subclass 323.
- 302 Superimposed:**  
This subclass is indented under subclass 301. The annular sections are superimposed upon each other radially of the wheel.
- (1) Note. For tires where the outer section encloses the inner section laterally, search this class, subclass 310 and indented subclasses.
- (2) Note. For superimposed annular sections joined by vulcanization or otherwise to form an integral tire, search this class, subclass 323 and indented subclasses.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
157 and 315, for similar subject matter.
- 303 Superimposed:**  
This subclass is indented under subclass 300. Sections of the tire are superimposed upon each other radially of the wheel. The outer sections may be nonresilient.
- 304 With apertured external binders:**  
This subclass is indented under subclass 300. The tire sections are secured to the wheel by bands or plates which are apertured for the tread portion of each section to project there-through.
- 305 Radial bolt secured:**  
This subclass is indented under subclass 300. The tire sections are secured to the wheel by radial bolts, or their equivalents, which directly engage the sections. A mounting to which the cushion tire section is permanently fixed is considered to be a part of the section.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
386, for similar subject matter.
- 306 Abutting sections:**  
This subclass is indented under subclass 300. The cushion tire sections abut each other at their ends.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
152 and 316, for similar subject matter.
- 307 With annular internal binders:**  
This subclass is indented under subclass 306. An annulus extends about the wheel within the sectional tire and binds the tire upon the wheel.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
152, 279, 283, 316, 388-392, and 399 for similar subject matter.

- 308 Interfitting:**  
This subclass is indented under subclass 306. The tire sections have projections and recesses at opposite ends which fit the ends of the abutting sections.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
316 and 335, for similar subject matter.
- 309 Indented at joints:**  
This subclass is indented under subclass 306. The abutting tire sections are so shaped and arranged as to provide indentations or recesses in the assembled tire at the joints between the sections.
- (1) Note. See this class, subclass 316.
- 310 Casing enclosed core:**  
This subclass is indented under subclass 246. The cushion tire consists of a casing enclosing a core. Where the core is integral with the casing the two must be distinct by reason of differing materials or arrangement.
- (1) Note. For integral cushion tires with no distinct core, see this class, subclass 323.
- SEE OR SEARCH CLASS:  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for laminating in general, and see especially subclasses 112 and 404 for the lines between the various classes with regard to processes and apparatus for filling tires.
- 311 Separate core:**  
This subclass is indented under subclass 310. The enclosed core is not attached to the casing.
- (1) Note. For tire filling compositions, see Class 106, Compositions: Coating or Plastic.
- 312 Removable:**  
This subclass is indented under subclass 311. The separate enclosed core is removable from the casing. This includes structure where the casing and rim together enclose the core.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
157 and 158, for similar subject matter.
- 313 Sponge rubber:**  
This subclass is indented under subclass 312. The removable separate enclosed core is sponge rubber.
- 314 With core compression:**  
This subclass is indented under subclass 312. The removable separate enclosed core is mounted upon the wheel in combination with means compressing it.
- 315 Superimposed rings:**  
This subclass is indented under subclass 312. The removable separate enclosed core consists of a plurality of rings superimposed upon each other in such fashion that they are positioned directly radially outward of each other.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
157 and 302, for similar subject matter.
- 316 Sectional transversely:**  
This subclass is indented under subclass 312. The removable separate enclosed core is divided transversely into sections.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
300 and 306-309, for similar subject matter.
- 317 Balls:**  
This subclass is indented under subclass 316. The transversely sectioned removable enclosed core consists of balls.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
336.1, for similar subject matter.
- 318 Integral structure:**  
This subclass is indented under subclass 312. The removable enclosed core is all of one piece.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
157 and 323, for similar subject matter.

**319 Recessed:**

This subclass is indented under subclass 318. The integral separate enclosed core is provided with recesses. This includes recesses of large circumferential extent and they may be grooves extending entirely around the tire.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
157 and 324, for similar subject matter.

**320 Chambered:**

This subclass is indented under subclass 319. The recessed integral separate enclosed core is provided with enclosed chambers. Such chambers may be formed by the combined tire and rim. This subclass includes chambers of large circumferential extent, and they may extend entirely around the tire.

(1) Note. See this class, subclasses 157, 322, 325, 327, and indented subclasses, 333.1, 338.1, 339.1, and 342.1.

**321 Perforated:**

This subclass is indented under subclass 318. The integral separate enclosed core has holes extending through it transversely.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
157 and 326, for similar subject matter.

**322 Chambered:**

This subclass is indented under subclass 318. The integral separate enclosed core is provided with enclosed chambers. Such chambers may be formed by the combined tire and rim. This subclass includes chambers of large circumferential extent, which may extend entirely around the tire.

(1) Note. See this class, subclasses 157, 320, 325, 327 and indented subclasses, 333.1, 338.1, 339.1, and 342.1.

**323 Integral:**

This subclass is indented under subclass 246. The cushion tire is composed of a single element.

(1) Note. For laminated cushion tires, see this class, subclass 300 and indented subclasses.

(2) Note. For integral cushion tires with a distinct core, see this class, subclass 310.

(4) Note. For caster tires, see Class 16, Miscellaneous Hardware (e.g., Bushing, Carpet Fastener, Caster, Door Closer, Panel Hanger, Attachable or Adjunct Handle, Hinge, Window Sash Balance, etc.), subclass 45 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
318,

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 112-113 and 404 for processes and apparatus for making nonpneumatic cushion tires.

**324 With recesses:**

This subclass is indented under subclass 323. The integral cushion tire is provided with surface depressions or indentations. This includes recesses of large circumferential extent, and they may be grooves extending entirely around the tire.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
319, for similar subject matter.

**325 Chambered:**

This subclass is indented under subclass 324. The recessed integral cushion tire is provided with an enclosed hollow place or places. Such chambers may be formed by the combined tire and rim. This subclass includes chambers of large circumferential extent, and they may extend entirely around the tire.

(1) Note. See this class, subclasses 157, 320, 322, 327, and indented subclasses, 333.1, 338.1, 339.1, and 342.1.

- 326 With perforations:**  
This subclass is indented under subclass 323. The integral cushion tire has holes extending through it transversely.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
321, for similar subject matter.
- 327 Chambered:**  
This subclass is indented under subclass 323. The integral cushion tire is provided with an enclosed hollow place. Such chambers may be formed by the combined tire and rim. This subclass includes chambers of large circumferential extent, which may extend entirely around the tire.
- (1) Note. See this class, subclasses 157, 161, 320, 322, 325, 333.1, 338.1, 339.1, and 342.1.
- 328 Multiple:**  
This subclass is indented under subclass 327. The chambered integral cushion tire is provided with two or more chambers.
- (1) Note. See this class, subclasses 157, 320, 322, 325, 333.1, and 338.1.
- 329 Annular:**  
This subclass is indented under subclass 328. The multiple chambers in the integral cushion tire are annular.
- (1) Note. See this class, subclasses 157, 320, 322, 325, 339.1, and 342.1.
- 331.1 Multiple chamber:**  
This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire consists of a plurality of enclosed hollow places.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
320, 322, 325, 328, and 329, for other multiple chamber constructions.
- 332.1 Cylinder and piston:**  
This subclass is indented under subclass 331.1. Subject matter wherein the multiple chambers comprise cylinders in which pistons work against air under pressure to carry the load.
- 333.1 Transverse walls:**  
This subclass is indented under subclass 331.1. Subject matter wherein the multiple chambers are provided with walls which extend transversely of the tire.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
320, 322, 325, and 328, for chamber structure.
- 334.1 Mutually free walls:**  
This subclass is indented under subclass 333.1. Subject matter wherein the transverse end walls of successive chambers are not united.
- 335.1 Interfitting:**  
This subclass is indented under subclass 334.1. Subject matter wherein the mutually free adjacent transverse end walls have projections and recesses which fit into each other.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
308, for interfitting abutting section.
- 336.1 Balls:**  
This subclass is indented under subclass 334.1. Subject matter wherein the mutually free transverse walled multiple chambers are spherical, or substantially so, in their assembled relation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
317, for additional spherical structure.
- 337.1 With simultaneous inflating means:**  
This subclass is indented under subclass 334.1. Subject matter wherein the tire and hub assembly are provided with means whereby the mutually free transverse walled chambers are inflated simultaneously from a single inlet.
- 338.1 With simultaneous inflating means:**  
This subclass is indented under subclass 333.1. Subject matter wherein tire and hub are in an assembled relation such that the transverse walled chambers are inflated at the same time from a single inlet.

**339.1 Annular chambers:**

This subclass is indented under subclass 331.1. Subject matter wherein the multiple chambers of the pneumatic tire are circular in form.

SEE OR SEARCH THIS CLASS, SUBCLASS:

320, 322, 325, and 329, for annular chambers.

**340.1 Mutually free walls:**

This subclass is indented under subclass 339.1. Subject matter wherein the walls of the annular multiple chambers are not united to each other.

**341.1 With simultaneous inflating means:**

This subclass is indented under subclass 340.1. Subject matter wherein the hub and tire are in an assembled relation such that the annular chambers with mutually free walls are inflated simultaneously from a single inlet.

**342.1 With simultaneous inflating means:**

This subclass is indented under subclass 339.1. Subject matter wherein the hub and tire are in an assembled relation such that the annular chambers are inflated at the same time from a single inlet.

**343.1 Sectional castings:**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire casing is composed of segments adapted to enclose an annular inner-tube.

SEE OR SEARCH THIS CLASS, SUBCLASS:

331.1 through 342.1, for multiple chamber pneumatic tire.

**344.1 Circumferential:**

This subclass is indented under subclass 343.1. Subject matter wherein the pneumatic tire casing is circumferentially divided elsewhere than in the rim zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

56, and 67, for spring wheels involving similar structure.

**345.1 Rigid inner sections:**

This subclass is indented under subclass 344.1. Subject matter wherein the pneumatic tire casing is composed of sections which are circumferentially divided and the inner section is inflexible.

- (1) Note. Where the rigid inner section of the tire extends substantially to the hub, it constitutes a wheel and is classified as a spring wheel which is classified in subclasses 8 through 10 of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

161, for similar rigid inner section structures.

**367 Patches:**

This subclass is indented under subclass 151. Devices for application to a tire surface for covering a puncture or blowout therein. They may or may not be cemented to the tire or seal the puncture. Where the claims involve a superficial fixing of the tire and do not involve a substantial removal of the material of the tire to permit a rebuilding, this subclass takes method claims except where heat is applied for vulcanization purposes. This subclass includes the combined tire and patch as well as the patch, per se.

- (1) Note. For patches and reinforcements around valve stems, see this class, subclass 430.
- (3) Note. For patch applying tools, see Class 81, Tools, subclasses 15.5, 15.6 and 15.7.
- (4) Note. For other patches, see Class 138, Pipes and Tubular Conduits, subclass 97 and indented subclasses.
- (5) Note. Wherein the repair of the casing a substantial part of the casing where it is damaged is removed and by the use of a special patch or otherwise the tire casing built up to the form and semblance of an original casing, see Class 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 94+.

- (6) Note. For processes and apparatus for patching a tire by a laminating operation see Class 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses.

SEE OR SEARCH CLASS:

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for methods of molding or shaping plastic materials within the class definition and which may include a vulcanization step, especially subclasses 36.1-36.22 for processes for repairing or restoring articles for use.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 11-27 for tire repairing apparatus, including vulcanizing means, especially subclasses 17-25 for tire recapping, rebeading or sidewall replacing means; and subclasses 28.1-58.1 tire or tire tube reshaping, resizing or vulcanizing means.
- 520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 166 for a composition containing a synthetic resin or natural rubber having utility as a puncture sealant for a pneumatic tire or for use in emergency repair of vehicular tires or to processes of preparing said composition.

**368 Mechanically secured:**

This subclass is indented under subclass 367. The patch is secured to the tire or rim by means other than the usual cementing, such as bolts, rivets, hooks, brads, or sewing.

**369 Inside and outside, bolt connected:**

This subclass is indented under subclass 368. Patches on both the inside and outside of the tire are connected and bound to the tire by a bolt or bolts or equivalent.

**370 With plugs:**

This subclass is indented under subclass 367. The patch is combined with an element that extends into or through and fills the puncture. The patch and plug are generally both rubber

and homogeneous. Mere bolts connecting inner and outer patches are not included.

**371 Bandages:**

This subclass is indented under subclass 367. The tire patch, including its securing means, extends at least from bead to bead of the casing, or from rim flange to rim flange, or encircles the inner tube.

- (1) Note. Where the bandage is internal, see this class, subclass 203, and indented subclasses.

**372 Mechanically secured:**

This subclass is indented under subclass 371. The bandage is secured in place by means other than friction or cement.

- (1) Note. Where the bandage is internal, see this class, subclass 203 and indented subclasses.
- (2) Note. For devices securing together the edges of the tire, search this class, subclass 364.

**373 To felly or rim:**

This subclass is indented under subclass 372. The bandage is mechanically secured to the felly or rim.

- (1) Note. Where the bandage is internal, see this class, subclass 203 and indented subclasses.

**375 Wheel securing means:**

This subclass is indented under subclass 151. Devices whereby resilient tires are held secured to vehicle wheels or rims.

- (1) Note. Where the tire is held secured substantially directly to the hub or axle, it constitutes a wheel. For such structure see this class, subclasses 7-10.
- (2) Note. For demountable rims for resilient tires, see class 301, Land Vehicles: Wheels and Axles, subclasses 10.1+. See this class, (152) subclass 402 for line with Class 301.

**376 Plural tire:**

This subclass is indented under subclass 375. The wheel securing means is adapted to mount more than one tire.

- (1) Note. For demountable plural rims, see Class 301, Land Vehicles: Wheels and Axles, subclasses 13.1+.
- (2) Note. For plural-tire wheel securing means involving one tire which comes into service only in emergencies, see Class 301, Land Vehicles: Wheels and Axles, subclasses 39.1+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220, for similar subject matter.

**377 Retracting wheel section:**

This subclass is indented under subclass 375. A section of the wheel or rim is adapted to be moved radially inwardly to enable the tire to be removed.

- (1) Note. For similar devices enabling removal of the rim, see Class 301, Land Vehicles: Wheels and Axles, subclass 16.

**378 Integral rims:**

This subclass is indented under subclass 375. The wheel securing means consists of a wheel rim constructed in a single piece and without cooperating means other than the tire.

**379.3 Interlocking tire and rim:**

This subclass is indented under subclass 378. Apparatus wherein the wheel or rim comprises projections engageable with the bead of a tire to prevent lateral movement of the tire relative to a bead flange on the wheel or rim.

- (1) Note. The projection may be mechanically secured to the wheel or rim.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
307, for resilient tires having abutting sections having annular internal binders.

**379.4 With elongate bead guard:**

This subclass is indented under subclass 379.3. Apparatus wherein the projections comprise rodlike elements extending through the rim.

- (1) Note. The rodlike elements may be removably attached to the wheel rim.

**379.5 Bead and rim interlock:**

This subclass is indented under subclass 379.3. Apparatus wherein the rim engaging part of the tire and the corresponding tire engaging part of the wheel rim are provided with parts which interengage to positively secure the tire to the wheel.

**380 Tire embraced rim:**

This subclass is indented under subclass 379.3. The edges of the tire extend down over the laterally outer surface of the rim and the tire is secured to the rim by virtue of such extension. Various specific securing means may be employed on the tire. For example, the tire edges may be laced together under the rim, or inextensible beads in the tire edges may be actuated to grip the rim by the pneumatic pressure in the tire.

- (1) Note. For tires embracing the rim and secured thereto by virtue of external clamps, see this Class, subclasses 397 and 398.

**381.3 Deep channel rim:**

This subclass is indented under subclass 379.3. Apparatus comprising a rim for mounting resilient tires provided with radially, outwardly extending flanges at its edges of greater diameter than the tire beads, and a depression extending radially inwardly for a distance such that a portion of the bead of the tire may be dropped into the depression for enough to allow a diametrically opposite portion of the bead to pass over the rim flange to operative position.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

345.1, for pneumatic tires having circumferential sectional casings with rigid inner sections.

- 381.4 With elongate circumferential bead guard:**  
This subclass is indented under subclass 381.3. Apparatus wherein the rim comprises a circumferential projection at least substantially paralleling the rim flange, the projection engaging the tire bead to prevent the bead from shifting laterally away from the rim flange.
- 381.5 With channel cover:**  
This subclass is indented under subclass 381.3. Apparatus wherein one or more articles is (are) placed over the depression in the wheel rim so as to completely overlay the depression.
- (1) Note. The article is generally an elongate metallic strap means of substantially the same or slightly greater width as the depression at its widest, the article being wrapped around and overlying the depression of the wheel rim.
- 381.6 With channel filler:**  
This subclass is indented under subclass 381.3. Apparatus wherein one or more articles is (are) placed into the depression of the wheel rim, the article or articles at least substantially reaching the level of the wheel rim.
- 382 Clincher rim:**  
This subclass is indented under subclass 379.3. Circumferential flanges upon the integral wheel or rim are directed laterally inwardly and engage the tire.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
400, for spreaders.
- 383 Pneumatic tire:**  
This subclass is indented under subclass 382. The clincher rim is used with a pneumatic tire. The tire bead contour in combination with the rim flanges is included in this class.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
400, for spreaders.  
539 through 547, for the tire beads.
- 384 With anti-creep lugs:**  
This subclass is indented under subclass 378. Lugs on the tire engage depressions in the rim, or vice versa, to prevent circumferential movement of the tire on the rim.
- 385 Axial:**  
This subclass is indented under subclass 375. Securing means extend through the tire parallel to the wheel axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
398, for lateral acting devices.
- 386 Radial:**  
This subclass is indented under subclass 375. Devices extending substantially radially in the plane of the wheel or parallel thereto and securing the tire to the wheel. This includes radial expansion devices.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
305, for radial bolt secured devices.
- 387 With circumferential tire incorporated clamps:**  
This subclass is indented under subclass 386. The radially extending devices cooperate with the elements within the tire and extend circumferentially of the wheel and act as clamping means. These elements need not be annular. The tire is adapted to carry the clamp, whether on or off the wheel.
- 388 With annular tire incorporated clamps:**  
This subclass is indented under subclass 375. An annulus within the tire extends about the wheel and binds the tire upon the wheel. The tire is adapted to carry the clamp, whether on or off the wheel.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
152, 279, 283, 307, and 399 for similar subject matter.
- 389 With mechanically joined ends:**  
This subclass is indented under subclass 388. The annulus has ends secured together mechanically.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
152, 279, 283, 307, and 399 for similar subject matter.
- 390 Adjustable:**  
This subclass is indented under subclass 389. The mechanical securing means is adjustable to regulate the size of the annulus.
- (1) Note. For turnbuckles and other adjustable length joints, see Class 403, Joints and Connections, subclasses 43+.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
152, 279, 283, 307, and 399 for similar subject matter.
- 391 Pneumatic tire:**  
This subclass is indented under subclass 390. The adjustable clamp is used with a pneumatic tire.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
152, 279, 283, 307, and 399 for similar subject matter.
- 392 Adjustable:**  
This subclass is indented under subclass 388. The clamps are adjustable to regulate the size of the annulus.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
152, 279, 283, 307, and 399 for similar subject matter.
- 393 Reinforced tire base structure:**  
This subclass is indented under subclass 375. The portion of the tire which seats upon the wheel is reinforced to aid in holding the tire secured to the wheel.
- (1) Note. For reinforced pneumatic tire beads, search this class, subclasses 539+.
- 394 Metallic external base ring:**  
This subclass is indented under subclass 393. There is a metallic annulus secured to the surface of the base of the tire, frequently by vulcanization, to aid in holding the tire secured to the wheel.
- 395 With annular exterior clamps:**  
This subclass is indented under subclass 393. An annulus extends outside the tire and about the wheel and cooperates with the reinforced tire base structure to bind the tire upon the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
304 and 397, for similar subject matter.
- 396 Separable rim parts:**  
This subclass is indented under subclass 375. The wheel securing means consists of more than one element besides the elements incorporated in the tire. All elements except those incorporated in the tire are considered to be rim parts, and these rim parts may be separated from each other.
- 397 Exterior clamps:**  
This subclass is indented under subclass 396. Comes and includes means for securing a pneumatic tire to a wheel comprising a device bearing on an exterior portion of the tire and clamping said portion against the rim or felly, either alone or in combination with cooperating modifications of the tire, rim, or felly. The clamp is usually annular.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
304 and 395, for similar subject matter.
- 398 Lateral acting:**  
This subclass is indented under subclass 397. Devices in which the exterior clamp for securing a pneumatic tire to a wheel acts laterally only, and clamps the portion of the tire upon which it bears to the rim or felly, or clamps two such portions against each other.
- 399 Interior clamps:**  
This subclass is indented under subclass 396. Means for securing a pneumatic tire to a wheel comprising a device applied to an interior portion of the tire and clamping it to a rim. The clamp may be annular. It may be actuated by the air pressure in the inflated tire.

- (1) Note. For securing rings to bind the tire on the rim, see this class, subclasses 152, 279, 283, 307, and 388 and indented subclasses.
- 400 Spreaders:**  
This subclass is indented under subclass 399. The interior clamps act laterally or laterally and downwardly to clamp adjacent portions of the tire against flanges on the rim.
- (1) Note. For bridge washers, see this class, subclass 430.
- 401 Combined sectional channel:**  
This subclass is indented under subclass 400. The spreader is combined with separable rim parts consisting of annular or arcuate sections of the rim provided with radially outwardly projecting tire retaining flanges. Said sections form a rim having a substantially smooth outer surface throughout, which supports the spreader and the tire.
- 402 Sectional channel:**  
This subclass is indented under subclass 396. The separable rim parts consist of annular or arcuate sections of the rim provided with radially outwardly projecting tire retaining flanges. The combined sections form a rim having a substantially smooth outer surface throughout, upon which the tire rests.
- (1) Note. The distinction between this class and the demountable rims of Class 301, Land Vehicles: Wheels and Axles, is this: Class 301, appropriate subclasses, takes claims to or including rims which may be removed with the tire from the wheel, and are adapted to carry the resilient tire in operative position either on or off the wheel, together with the necessary elements of such constructions. Otherwise the claims come to this class (152). Elements which are capable of use both in the demountable rim structure of Class 301, and in the rim structure of this class for securing the tire to the rim are placed in this class (152).
- (2) Note. For demountable sectional channel rims, see Class 301, Land Vehicles: Wheels and Axles, subclasses 35.1+.
- (3) Note. For wheels comprising separable disk or annular wheel sections consisting of more than a rim and having peripheries providing a sectional channel supporting the tire, see Class 301, Land Vehicles: Wheels and Axles, subclass 9.1. For such wheel sections permanently secured together, see said Class 301, subclass 63.101.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
401, for combined sectional channel devices.
- 403 Duplicate sections:**  
This subclass is indented under subclass 402. The sectional channel comprises duplicate sections upon opposite sides of the rim for securing the tire in place.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
401, for combined sectional channel devices.
- 404 Pneumatic tire:**  
This subclass is indented under subclass 403. The duplicate sections are constructed and arranged for use with a pneumatic tire.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
401, for combined sectional channel devices.
- 405 Pneumatic tire:**  
This subclass is indented under subclass 402. The sectional rim parts are constructed and arranged for use with a pneumatic tire.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
401, for combined sectional channel devices.
- 406 Split side flange:**  
This subclass is indented under subclass 405. One of more of the rim sections, with its tire securing flange, is transversely divided to facilitate its assembly with the rest of the rim, and fits behind a projection on a fixed rim section or other part of the wheel.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 407 End connected:**  
This subclass is indented under subclass 406. The ends of the split side flange are connected together either directly or by the intermediation of a second element not a part of the fixed rim.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
397, and 401, for similar subject matter.
- 408 With rim engaging end lugs:**  
This subclass is indented under subclass 406. The ends of the split side flange are provided with lugs engaging a fixed section of the rim or other part of the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 409 Locking rim secured:**  
This subclass is indented under subclass 405. One or more of the rim sections is secured in place by a ring which is in turn supported by a fixed rim section, the felly, or the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 410 Split locking ring:**  
This subclass is indented under subclass 409. The locking ring is transversely divided to facilitate its application to the wheel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 411 Overlapping section:**  
This subclass is indented under subclass 405. Parts of the sectional rim overlap each other transversely of the wheel. One may be entirely supported by the other, or overlap for its whole width.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 412 Bayonet or threaded joint:**  
This subclass is indented under subclass 411. One or more of the overlapping rim sections is jointed to the wheel by means in the general nature of a bayonet joint. That is, the section is applied by transverse motion followed by rotary motion, or by a combination of the two. This includes screw threaded sections.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 413 Bayonet or threaded joints:**  
This subclass is indented under subclass 405. One or more of the rim sections is joined to the wheel by means in the general nature of a bayonet joint. That is, the section is applied by transverse motion followed by rotary motion, or by a combination of the two. This includes screw threaded sections.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.
- 414 Hinged section:**  
This subclass is indented under subclass 405. One or more of the sections of the rim, bearing a tire retaining flange, is hinged to a fixed section of the rim or other part of the wheel, so that it may be swung away from the remainder of the rim to facilitate removal of the tire.
- (1) Note. For similar devices to facilitate removal of the rim, see Class 301, Land Vehicles: Wheels and Axles, subclass 32.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
401, for combined sectional channel devices.

**415 Inflating devices:**

This subclass is indented under subclass 151. Devices combined with vehicle or wheel structure for inflating pneumatic tires, filling attachments adapted to remain with a particular wheel between periods of inflation and means for inflating one tire from another.

**SEE OR SEARCH CLASS:**

- 137, Fluid Handling, subclasses 223-234.5 for valved inflation stems or valved filling chucks for tires.
- 141, Fluent Material Handling, With Receiver or Receiver Coating Means, subclasses 4-8 for processes of filling receivers involving gas or variation of gaseous conditions in the receiver, and subclass 38 for tire inflating apparatus involving plural fluids. Patents disclosing and/or claiming apparatus or processes for filling tires with any material are cross-referenced to the subclass if they involve manipulation of the tire or apparatus other than the conventional chuck and tire valve.
- 222, Dispensing, subclasses 3-6 for gas dispensers of general utility even though disclosed for inflating tires.
- 251, Valves and Valve Actuation, subclasses 149-149.7 for valved inflating chucks.
- 280, Land Vehicles, subclass 201 for combination of an inflating means with a velocipede including a modified velocipede frame as a part of the combination.
- 285, Pipe Joints or Couplings, appropriate subclasses, especially subclasses 196, 304, 338 and 345-346 for inflating chucks.
- 417, Pumps, for air pumps, per se, and especially subclasses 229+ for combinations of an inflating pump and a vehicle which operates the pump, but not operating to inflate the tire while the vehicle is in motion.
- 520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 166 for a composition containing a synthetic resin or natural rubber having utility as a puncture sealant for a pneumatic tire

for use in emergency repair of vehicular tires or to processes of preparing said composition.

- 604, Surgery, subclasses 264-284 for devices in the form of the inflating needles, but intended for surgical use.

**416 Vehicle body carried supply:**

This subclass is indented under subclass 415. Where the inflating device is for inflating pneumatic tires while the vehicle is in motion and comprises an air supply source as a pump or a tank carried by a portion of the vehicle other than the wheels or tires, and is combined with air lines to the tires.

**SEE OR SEARCH CLASS:**

- 417, Pumps, subclasses 231-233, for vehicle mounted or attached pumps operated by the vehicle.

**417 Rotary joints:**

This subclass is indented under subclass 416. Joints for transferring air under pressure from the vehicle body to a rotating wheel.

**418 Wheel carried supply:**

This subclass is indented under subclass 415. The inflating means is for inflating pneumatic tires while the vehicle is in motion, and comprises an air supply source carried by a wheel.

**SEE OR SEARCH CLASS:**

- 137, Fluid Handling, subclasses 458 through 466 for pressure regulators in combination with cut-off, and subclasses 505-505.47 for pressure regulators, per se.

**419 With positive pump operating means:**

This subclass is indented under subclass 418. Devices in which the air supply source carried by the wheel is a pump and means are provided for positive operation thereof.

**420 Gearing:**

This subclass is indented under subclass 419. The pump operating means comprises a gear.

**421 Cam:**

This subclass is indented under subclass 419. The pump operating means comprises a cam.

- 422 Eccentric bearing:**  
This subclass is indented under subclass 421. The pump operating means comprises an eccentric bearing.
- 423 Obstacle:**  
This subclass is indented under subclass 419. The pump operation involves contact of an element on the rotating wheel with an obstacle.
- 424 Ground:**  
This subclass is indented under subclass 423. The operating obstacle is the ground.
- 425 Casing interposed:**  
This subclass is indented under subclass 424. The tire casing is interposed between the pump operating element on the rotating wheel and the ground, the ground serving as the operating obstacle.
- 426 Casing enclosed pump:**  
This subclass is indented under subclass 425. The pump is enclosed within the casing and the ground serves as the obstacle for its operation.
- 427 Combined wheel and valve stem:**  
This subclass is indented under subclass 415. The inflating valve stem is secured to the wheel or rim or to the wheel and tire and may include in the claims a valve.
- (1) Note. For this combination further combined with a multiple chamber tire, see this class, subclasses 331.1+.
- SEE OR SEARCH CLASS:  
137, Fluid Handling, subclasses 223-234.5 for valved inflation stems for tires.  
251, Valves and Valve Actuation, appropriate subclasses for valves, per se.
- 428 With dust cap:**  
This subclass is indented under subclass 427. Devices coming which include also a dust cap.
- SEE OR SEARCH CLASS:  
137, Fluid Handling, subclasses 232-234 for valved inflation stems or filling chucks for tires combined with caps for protecting or sealing the ends thereof.
- 138, Pipes and Tubular Conduits, subclasses 89.1 through 89.4 for caps for inflation stems.
- 429 Combined tire and valve stem:**  
This subclass is indented under subclass 415. The inflating valve stem is secured to the tire and may include in the claims a valve.
- (1) Note. See notes to this class, subclass 427.
- (2) Note. For this combination further combined with a multiple chamber tire, see this class, subclass 331.1 and indented subclasses.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
427 and 428, for similar subject matter.
- SEE OR SEARCH CLASS:  
285, Pipe Joints or Couplings, subclass 200 for a coupling between a pipe and flexible plate.
- 430 Reinforcements or patches:**  
This subclass is indented under subclass 429. Inventions directed to modifications of the stem structure or to patches or reinforcement of the tire. These are intended to effect a better union of the tire and stem.
- (1) Note. For other reinforced inner tubes, see this class, subclasses 511 and 512.
- (2) Note. For tire patches in general, see this class, subclasses 367+.
- (3) Note. For valve casings, per se, see Class 138, Pipes and Tubular Conduits, subclasses 100-178, especially subclass 177 for valve casings, per se.
- 431 Combined valve stem cap and tool:**  
This subclass is indented under subclass 415. Closure for the open end of a pneumatic tire valve casing, generally known as a valve cap, in combination with a tool for manipulation of the valve.
- (1) Note. For such tools, per se, see Class 81, Tools, subclass 15.4.

- (2) Note. For valve caps, per se, or combined valve bodies or stems and dust caps, and for combined valve caps and dust caps, see Class 138, Pipes and Tubular Conduits, subclasses 89.1 to 89.4 indented under subclass 89.

**450 Pneumatic tire or inner tube:**

This subclass is indented under subclass 151. Subject matter wherein a tire casing structure contains a chamber or chambers or a flexible closed annular element carried in said chamber whereby said chamber or annular element is filled with fluid under pressure greater than atmospheric pressure to sustain the tire in inflated shape upon a hub or rim element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 331.1, for multiple chamber tires; subclasses 343.1-345.1 for pneumatic tire casings having sections adapted to enclose an inner tube; subclasses 317, 320, 322, 325, and 327-329 for resilient tires having chambers with elastic walls wherein the pressure is atmospheric; subclass 195 for armored inner tubes; and subclasses 510-512 for inner tubes.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 110.1-135 and 394.1-421.8 for processes and apparatus for making pneumatic tires.
- 295, Railway Wheels and Axles, subclass 12 for pneumatic tires used on railway vehicles.
- 428, Stock Material or Miscellaneous Articles, appropriate subclass for stock material product in the form of a single or plural layer web or sheet including strips, strands or fibers, and especially subclasses 105-113 for a composite web or sheet in which constituents or elements (e.g., fibers, strands, etc.) in one layer are disposed at an angle to those in another layer; and subclass 114 for such products in which a parallel relationship exists between the constituents of the layers.

**451 Tire cord reinforcement materials, per se:**

This subclass is indented under subclass 450. Subject matter wherein significance is attributed to the strengthening material or its structure and not the location of its application or use in the tire casing.

- (1) Note. The cord materials in this subclass are materials for tire reinforcement which are not claimed as specific components of the belt, breaker, bead or carcass portions of a tire. Because of the nature of these materials, this subclass is exclusive in nature rather than inclusive in order to collect materials used in tire casings which are of a general nature and not specifically claimed for use in particular portions of the tire casing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 526+, 539+ and 548+, for reinforcing materials used in belt, breaker, bead and carcass portion of the tire.

**452 Cordless tires (e.g., cast tires, etc.):**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire lacks substantial cord reinforcement in the structure of the tire casing.

- (1) Note. The use of bead reinforcements or breaker/belt reinforcement without carcass reinforcements constitutes a pneumatic tire without substantial cord reinforcement for the purposes of this subclass.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 125 for a process of making tires wherein outer layers are injection molded.

**453 Tire characterized by closed annular transverse cross section:**

This subclass is indented under subclass 450. Subject matter wherein a cross section defined by a plane passing through the axis of the pneumatic tire defines a continuous, circular-type configuration.

- (1) Note. Such tires are often referred to as closed-torus tires. Closing of the cross section of the tire via the use of discrete flaps or the like that are not integral and contiguous with the remainder of the tire is not included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 501, 513, 514, and 515, for casing closures, flaps and the like, that are used to close an otherwise open-belled pneumatic tire.

**454 Tire characterized by the dimension or profile of the cross sectional shape:**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire is distinguished by a mathematical relationship (e.g., equation, ratio, etc.) or absolute dimension (e.g., radius of curvature, etc.) which mathematical relationship or absolute dimension describes the cross-sectional profile (e.g., profile of neutral axis of carcass reinforcement, etc.) or cross-sectional shape (e.g., aspect ratio or transverse tread curvature, etc.) of the pneumatic tire.

**455 Asymmetric tire:**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire, either by virtue of its reinforcing material or its cross-sectional shape, does not present two mirror image halves when transverse cross-section thereof is longitudinally bisected.

- (1) Note. Asymmetry in the breaker or belt structure due to the angular orientation of the cord of the ply or plies therein is not provided for in the subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 209, for a resilient tire having an asymmetric tire tread and subclasses 530 and 534 for pneumatic tires having belt or breaker layers wherein asymmetry may result due to the angular orientation of the cords of the ply or plies in the breaker or belt layers.

**456 Asymmetry due to cross sectional profile:**

This subclass is indented under subclass 455. Subject matter wherein the asymmetry in the pneumatic tire is a result of the transverse cross-sectional shape or profile of the pneumatic tire.

**457 Tire foldable into storage or nonuse condition (e.g., collapsible space-saving spare tire, etc.):**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire in the inflated condition has a conventional toroidal shape but while in a deflated condition assumes a shape wherein a portion of the tire, e.g., the sidewalls or tread, etc., are folded to decrease the overall dimensions of the deflated tire relative to its overall dimension in the inflated state.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 152, for emergency resilient tires which are constructed and arranged for rapid and convenient manual application upon a rim to temporarily replace the ordinary tire and subclass 522 for pneumatic tires having means facilitating folding between sidewall portions during pneumatic tire operation.

**458 Tire reinforcement material characterized by short length fibers or the like:**

This subclass is indented under subclass 450. Subject matter wherein the tire casing contains strengthening material in the form of short, discrete and discontinuous filaments.

**500 With means restricting relative movement between tire and inner tube (e.g., anti-creep feature, etc.):**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire casing or the inner tube is provided with means which tend to keep them from slipping relative to one another.

**501 With means to protect inner tube from rim:**

This subclass is indented under subclass 450. Subject matter wherein an annular band extending around the rim and interposed between the inner tube and the rim is designed

to protect the inner tube from contact with the rim.

- (1) Note. The band is generally wide enough to overlap the tire beads and the overlap extends inside the casing between the inner tubes and beads. The band may be loose or secured to a portion of the tire/tube/rim assembly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 514, for flaps or bands attached to the tire casing; subclass 512 for reinforcement in the rim zone of the inner tube serving the protective purpose of a tire flap or band and subclasses 400 and 401 for devices for spreading beads apart which may also serve to protect the inner tube from the rim.

**502 Automatic sealing of punctures (e.g., self-healing, etc.):**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire or inner tube is provided with a self-healing feature comprising material provided in the pneumatic tire or inner tube or within cavities or chambers defined by said pneumatic tire or inner tube, which material is of such a nature as to tend to seal breaks made in the pneumatic tire or inner tube surface.

SEE OR SEARCH CLASS:

- 428, Stock Material or Miscellaneous Articles, cross-reference art collection 912 for puncture healing layers generally.  
523, Synthetic Resin or Natural Rubber, subclass 166 for the puncture sealants.

**503 Using flowable coating or composition:**

This subclass is indented under subclass 502. Subject matter wherein the sealing of punctures in a pneumatic tire or inner tube is effected by the use of a coating or composition which is capable of fluid motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 521, for internal lubricating or cooling compositions that may also possess sealant properties.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, subclass 33 for leak stopping coating or plastic compositions.  
523, Synthetic Resins or Natural Rubbers, subclass 166 for tire puncture sealants.

**504 On inner surface of tubeless tire:**

This subclass is indented under subclass 503. Subject matter wherein the pneumatic tire is tubeless and the flowable coating or composition is provided on the interior surface of the pneumatic tire.

- (1) Note. The coating or composition may be provided on the interior of a tubeless tire inner liner in the tire.

**505 Sealant in plural layers or plural pockets:**

This subclass is indented under subclass 504. Subject matter wherein the flowable coating or composition provided on the inner surface of the tubeless tire is separated into multiple discrete compartments which are located transversely or annularly of the tire.

**506 Within or part of construction of inflating inner tube:**

This subclass is indented under subclass 503. Subject matter wherein the flowable coating or composition is provided as an integral part of the inner tube.

**507 Sealant in plural layers or plural pockets:**

This subclass is indented under subclass 506. Subject matter wherein the flowable coating or composition is an integral part of the inner tube and is contained in separate multiple discrete compartments in the inner tube which are located transversely or annularly of the tire.

**508 By compression:**

This subclass is indented under subclass 502. Subject matter wherein the pneumatic tire or inner tube contains an elastomeric element under lateral or circumferential stress or pressure, said elastomeric element having a tendency to close punctures as fluid pressure escapes from the tire.

- SEE OR SEARCH CLASS:  
137, Fluid Handling, subclasses 843-860 for apertures intended for inflation and closed by the pressure of the surrounding material.
- 509 With reinflating means:**  
This subclass is indented under subclass 502. Subject matter wherein the self-healing pneumatic tire or inner tube is also provided with means to generate fluid pressure to aid in the inflation of the pneumatic tire or inner tube after puncture.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
519, and 521, for tires having run flat features that are inflated or expanded upon emergency or that possess internal lubrication and/or cooling means, respectively.
- 510 Tire characterized by its air impervious liner or inner tube:**  
This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire possesses an integral layer or coating of elastomeric material which has a relatively high resistance to the diffusion of air at its inner air contacting surfaces or wherein a flexible closed annular element is carried within the chamber of the tire filled with fluid under pressure which is greater than atmospheric pressure.
- (1) Note. The inner tube can be claimed alone or in combination with a pneumatic tire.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
450, for pneumatic tire or inner tube.
- 511 Inner tube:**  
This subclass is indented under subclass 510. Subject matter wherein a flexible closed annular element is carried within the chamber of the tire filled with fluid under pressure that is greater than atmospheric pressure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
450, for pneumatic tire or inner tube.
- 512 With reinforcement element:**  
This subclass is indented under subclass 511. Subject matter wherein the inner tube is strengthened throughout at least a portion of its extent.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
195, for armored inner tubes.
- 513 With means to protect tire from rim:**  
This subclass is indented under subclass 450. Subject matter wherein an annular band extends around the rim to protect the tire from the rim.
- (1) Note. The band may be wide enough to overlap the tire beads, in which case the overlap extends underneath the beads. The band may be loose or secured to the rim.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
400, and 401 for devices for spreading beads apart which may also serve to protect the tire from the rim and subclass 501 for means to protect the inner tube from a rim.
- 514 Means other than rim closing the tire opening:**  
This subclass is indented under subclass 450. Subject matter wherein means, other than a rim, are interlocked with, attached to, or an integral part of the pneumatic tire casing for closing an opening therein through which an inner tube may be inserted or for closing a similar opening in a tubeless tire.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
501, and 513 for similar devices from the tire.
- 515 Positive casing closure:**  
This subclass is indented under subclass 514. Subject matter wherein the pneumatic tire casing closure is actuated either by response to the inflated pressure in the tire or by the use of means actuated by hand and said closure performs its function whether the tire is on or off the rim.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

372, for pneumatic tire bandages which may extend from rim flange to rim flange and are secured in place by mechanical means.

**516 With means enabling restricted operation in damaged or deflated condition:**

This subclass is indented under subclass 450. Subject matter wherein the pneumatic tire or inner tube is provided with means which permit the resultant assembly to continue operation when the inflation pressure in the pneumatic tire or inner tube drops substantially below normal or when the pneumatic tire or inner tube is punctured or otherwise damaged.

(1) Note. The means referred to herein are often called "run flat" devices in the art. The means may be an integral part of the pneumatic tire, located within the pneumatic tire cavity or external to the pneumatic tire.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

152, for temporary replacement tires and 158 for internal buffers which assume load when the pneumatic tire is deflated or distorted beyond the normal amount.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 45.6, 45.7, 48, 49, and 146 - 146.8 for means to measure tire pressure and detect loss of tire pressure.

116, Signals and Indicators, subclass 34 for tire inflation or deflation indicators.

137, Fluid Handling, subclasses 227-229 for tire pressure gauges or indicator means.

340, Communications: Electrical, subclasses 442-448 for tire deflation signal systems.

**517 With sidewall insert to facilitate load support in emergency:**

This subclass is indented under subclass 516. Subject matter wherein the structural stiffness of a pneumatic tire sidewall is enhanced by

additional means which compensates for potential loss of pneumatic stiffness by deflation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

549, and 555 for cushion and sidewall stiffening means employed in the carcass construction of a pneumatic tire.

**518 Utilizing additional inflatable supports which become load bearing in emergency:**

This subclass is indented under subclass 516. Subject matter wherein the additional means which permits the assembly to continue operations is a pneumatic member located in the chamber of the pneumatic tire which supports the pneumatic tire when the tire is damaged or loses inflation pressure.

(1) Note. The supports in this subclass are reinflated and merely support the tire load on the roadway when the tire is damaged and loses air pressure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

331.1 through 342.1 for multiple chamber pneumatic tires and 158 for internal buffers.

**519 Inflated or expanded in emergency only:**

This subclass is indented under subclass 518. Subject matter wherein an inflatable member carried in the tire chamber is inflated to support the tire in response to damage resulting in the loss of air pressure.

**520 Utilizing additional noninflatable supports which become load supporting in emergency:**

This subclass is indented under subclass 516. Subject matter wherein the support means which permit the tire assembly to continue operation when its inflation pressure drops is an integral part of the tire either located within the tire cavity or external to the tire.

(1) Note. Such means generally protrude from the rim portion of the tire to support the tire in the event of an emergency.

**521 Internal lubricating or cooling:**

This subclass is indented under subclass 516. Subject matter wherein the support means which enables restricted operation of the tire in a damaged or deflated condition comprises a lubricating or cooling composition which is disposed in the pneumatic tire chamber.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

503 through 507 for sealant compositions that may also possess cooling or lubricating properties.

**522 Means facilitating folding between sidewall portions (e.g., run flat sidewalls, etc.):**

This subclass is indented under subclass 516. Subject matter wherein the tire includes sidewalls which are foldable on themselves at predetermined adjacent sidewall portions to sustain the tire in inflated condition to permit continued operation of the tire upon loss of inflation pressure during use.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

457, for pneumatic tires that are foldable for storage or nonuse condition.

**523 Arrangement of grooves or ribs in sidewall:**

This subclass is indented under subclass 450. Subject matter which includes structure wherein the part of the tire between the edge of the tread and the rim which contains one or more sequentially adjacent arcuate modules which are either raised projections or furrowed and form a segmented or solid annular band concentric with that part of the tire extending between the rim and the tread edge.

**524 Having annular inlay or cover or sidewalls (e.g., white sidewalls, etc.):**

This subclass is indented under subclass 450. Subject matter which includes the structure of that part of the tire between the edge of the tread and the rim which comprises a filled section or an applique of material in a color other than black thereon for the purpose of esthetic color contrast.

(1) Note. Patents disclosing protective coatings for sidewalls or colored sidewalls will be found in this subclass.

**525 Characterized by chemical composition or physical properties of external sidewall materials:**

This subclass is indented under subclass 450. Subject matter which includes structure of that part of the tire between the edge of the tread and the rim which comprises a material formed by the interaction of two or more chemical substances or a combination of chemical substances exhibiting an essential or distinctive attribute to enhance the adhesion of the said part to the tire body or carcass or improve the general structural characteristics of the tire.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

537, for chemical compositions or physical properties of belt or breaker materials.

**526 Characterized by belt or breaker structure:**

This subclass is indented under subclass 450. Subject matter which includes one or more relatively thin threads, filaments, yarns, wires, cables, bands, braids or the like formed into cords or reinforcing elements which are arranged parallel to each other to form a ply which annularly extends continuously around the tire casing substantially from shoulder region to shoulder region of a tire tread to add strength to said tire tread area or to protect the tire casing in this region.

(1) Note. The threads, filaments, yarns, etc., may be of wire, glass, natural or synthetic fibers usually referred to in the art as cords. Cords arranged in a substantially parallel relationship constitute a ply.

(2) Note. The annular arrangement of reinforcing material in a ply between the tread and carcass is commonly referred to as a belt or breaker. Traditionally belts have been employed for reinforcement and hoopstrength whereas breakers have been employed for the protection of underlying carcass layers. However, the terms are sometimes used interchangeably in the art.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
197, through 202 for similarly located armor.
- 527 Physical structure of reinforcing cords:**  
This subclass is indented under subclass 526. Subject matter wherein significance is attributed to the size, shape, diameter, strength, or the elongation factor of the cord reinforcing elements.
- 528 Folded ply structure:**  
This subclass is indented under subclass 526. Subject matter wherein the annular belt or breaker is doubled back upon itself to enhance reinforcement of the shoulder or tread area in order to reduce separation tendencies and transverse stress in the tire.
- 529 Utilizing two or more cord materials:**  
This subclass is indented under subclass 528. Subject matter wherein the folded belts or breakers have reinforcing elements of dissimilar materials.
- (1) Note. The material of the strengthening elements can be dissimilar between or among plies or can be dissimilar within a given folded ply.
- 530 Consisting of only one ply:**  
This subclass is indented under subclass 526. Subject matter wherein a single layer of reinforcement material is placed between the carcass and tread area of the tire.
- 531 Utilizing at least one ply the cords of which run circumferentially (zero-degree belt):**  
This subclass is indented under subclass 526. Subject matter wherein the cords of the belt or breaker material define an angle of substantially zero degrees relative to a median equatorial plane of the tire.
- (1) Note. Patents having single substantially zero degree cords are provided for in this subclass.
- 532 With cushioning or other special rubber ply layer:**  
This subclass is indented under subclass 526. Subject matter wherein a discrete layer of natural or synthetic elastomeric material is provided in the belt or breaker region of the tire.
- 533 Reinforcing plies made up from wound narrow ribbons:**  
This subclass is indented under subclass 526. Subject matter wherein the belt or breaker material is comprised of material formed into thin strips or bands which strips or bands are wrapped around the carcass in the belt or breaker region according to a predetermined pattern.
- 534 Structure where each bias angle reinforcing cord ply has no opposingly angled ply:**  
This subclass is indented under subclass 526. Subject matter wherein the cords of the belt or breaker structure are disposed at an angle to the circumferential direction of the tire such that for the cords of each bias angled belt or breaker there is no second equal oppositely angled ply.
- 535 Structure made up of two or more sets of plies wherein the reinforcing cords in one set lie in a different angular position relative to those in other sets:**  
This subclass is indented under subclass 526. Subject matter wherein the belt or breaker is composed of multiple plies wherein the strengthening cords of one group of plies cross the equatorial plane of the tire at equal but opposite angles and the strengthening cords of another group of plies cross the equatorial plane of the tire at a different, equal and opposite angle.
- 536 Structure using multiple reinforcing elements made of differing materials:**  
This subclass is indented under subclass 526. Subject matter wherein the belts or breakers have reinforcing cords of dissimilar strengthening materials.
- (1) Note. The strengthening materials can be dissimilar between or among plies or can be dissimilar within a given ply.

**537 Breaker or belt characterized by the chemical composition or physical properties of elastomer or the like:**

This subclass is indented under subclass 526. Subject matter wherein the belt or breaker region of the tire includes a material formed by the reaction of two or more chemical substances or a combination of chemical substances exhibiting an essential or distinctive attribute to enhance the general structural characteristics of the tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

525, for chemical compositions or physical properties of external side wall materials.

**538 Belt or breaker characterized by its dimensions or curvature relative to the carcass or any other part of the tire:**

This subclass is indented under subclass 526. Subject matter wherein significance is attributed to the size relationship or the curvilinear profile or the belt or breaker in respect to the tire or its underlying carcass.

**539 Characterized by the structure of the bead portion of the tire:**

This subclass is indented under subclass 450. Subject matter which includes structure of the annular edge of the pneumatic tire which open at the rim zone and includes annular reinforcing elements to anchor the tire or the tire carcass material to the rim.

(1) Note. The annular edges of the tire are referred to in the art as the tire beads. The annular reinforcing elements of the beads are referred to in the art as bead cores.

SEE OR SEARCH THIS CLASS, SUBCLASS:

391, for similar devices in the nature of annular clamps enclosed in the edges of the tire.

SEE OR SEARCH CLASS:

57, Textiles: Spinning, Twisting, and Twining, subclass 201 for textile grommets.

140, Wireworking, subclass 88 for processes of making wire tire beads.

245, Wire Fabrics and Structure, subclass 1.5 for wire tire bead grommets.

**540 Structure of inextensible reinforcing member:**

This subclass is indented under subclass 539. Subject matter wherein the bead portion of the tire is characterized by, e.g., the size, shape or material of the annular reinforcing element which annular reinforcing element is incapable of being extended or stretched in the circumferential direction.

**541 Apex or filler strip:**

This subclass is indented under subclass 539. Subject matter wherein the carcass is wound around the bead anchoring annular reinforcing element which wound about portion is separated from the main carcass portion by a substantially wedge shaped insert or by a substantially triangular insert.

(1) Note. The wedge shaped or triangular insert is generally disposed radially above the annular reinforcing element.

**542 Flipper strips:**

This subclass is indented under subclass 539. Subject matter wherein an annular strip of cord reinforced elastomeric material is wrapped directly around and in contact with the bead anchoring reinforcing element and between the bead anchoring reinforcing element and the carcass material.

**543 Chafer or sealing strips:**

This subclass is indented under subclass 539. Subject matter wherein an annular elastomeric strip that may include reinforcing material is disposed in the bead region of the tire but is not in direct contact with the annular reinforcing element.

(1) Note. These annular elastomeric strips are employed to, e.g., reinforce the turned up edge of the carcass, reduce chafing between the tire and the rim and minimize undesirable air diffusion into or out of the tire.

**544 Bead contour for engagement with mounting rims (e.g., lips, ribs, or grooves, etc.):**

This subclass is indented under subclass 539. Subject matter wherein the hub or rim contacting portion of the tire contains additional friction enhancing means to insure better grip between said rim contacting portion of the tire and the rim.

- (1) Note. The additional friction enhancing means result from the overall outer contour of the rim contacting portion of the tire.

**545 Multiple bead cores at each terminal edge or tire supporting surface:**

This subclass is indented under subclass 539. Subject matter wherein the rim contacting portion of the tire contains two or more annular reinforcing elements.

**546 Bead characterized by the radial extent of apex, flipper or chafer into tire sidewall:**

This subclass is indented under subclass 539. Subject matter wherein significance is attributed to the radial height of a wedge shaped or triangular insert, the height of a bead core contacting annular strip either in an absolute sense or in a relative sense with respect to other portions of the tire.

**547 Bead characterized by the chemical composition and or physical properties of elastomer or the like:**

This subclass is indented under subclass 539. Subject matter wherein the bead portion of the tire comprises material formed by the interaction of two or more chemical substances or a combination of chemical substances exhibiting an essential or distinctive attribute to enhance the general structural characteristics of the tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 525, for chemical compositions or physical properties of external sidewall materials and subclass 537 for belt or breaker structure or particular chemical composition or physical properties.

**548 Characterized by the carcass, carcass material, or physical arrangement of the carcass materials:**

This subclass is indented under subclass 450. Subject matter wherein the tire casing comprises a portion, exclusive of a tread and an external covering portion, which forms the body of the tire and is composed of materials, usually fabric layers impregnated with rubber, wherein significance is attributed to the specific materials or their disposition relative to each other or with respect to the rest of the tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 192, through 194 and 196-202 for armored carcass construction.

SEE OR SEARCH CLASS:

- 57, Textiles: Spinning, Twisting, and Twining, appropriate subclasses for a web or sheet product distinguished only by the twisted, covered and/or wrapped strand constituents.
- 66, Textiles: Knitting, appropriate subclasses for a knitted product not provided for elsewhere.
- 87, Textiles: Braiding, Netting, and Lace Making, subclasses 1 through 13 for a stock material product including a braided, net, or lace component that is coated or impregnated.
- 139, Textiles: Weaving, subclasses 383-428 for a stock material product which is in the form of a web, sheet or woven strand and is the product of a method or apparatus provided for in that class (139).
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a stock material product in the form of a single or plural layer web or sheet including strips, strands or fibers, and especially subclasses 105-113 for a composite web or sheet in which elements or constituents (e.g., fibers, strands, etc.) in one layer are disposed at an angle to those in another layer; and subclass 114 for such a product in which a parallel relationship exists between the constituents of the layers.

- 549 Cushion means inward of outermost carcass ply:**  
This subclass is indented under subclass 548. Subject matter wherein elastomeric means is provided interior of the radial and axial outermost carcass ply of the tire to absorb shock or stress created in the carcass ply or plies.
- 550 Carcass ply extends from at least one bead region without being folded about any bead rings:**  
This subclass is indented under subclass 548. Subject matter wherein the rim contacting portion of the tire includes the annular edges having annular reinforcing elements to anchor the tire or the tire carcass layers which terminate in spaced relation to one such annular reinforcing element without being wrapped around any annular reinforcing element.
- 551 Carcass ply only folded about one bead ring:**  
This subclass is indented under subclass 548. Subject matter wherein the rim portion of the tire includes annular edges having annular reinforcing elements to anchor the tire or the tire carcass material to the rim and include carcass layers which are wrapped around only the annular reinforcing element or elements in one of the two annular edges or bead regions of the tire.
- 552 Carcass ply turnup structure around bead rings:**  
This subclass is indented under subclass 548. Subject matter wherein the rim contacting portion of the tire includes annular edges having annular reinforcing elements to anchor the tire or the tire carcass material to the rim and include carcass layers that are wrapped around the annular reinforcing elements wherein the tire is characterized with regard to the manner in which the carcass layer or layers are folded or wrapped around the annular reinforcing elements.
- 553 Folded from outside to inside of bead core:**  
This subclass is indented under subclass 552. Subject matter wherein the carcass plies are turned about the rings in a direction from the axial outer wall of the bead portion of the tire to the inner wall of the bead portion of the tire which direction is the reverse of the more conventional disposition of the carcass plies about the annular reinforcing elements.
- 554 Characterized by the extent of the fold up into the sidewall of the tire relative to the other tire dimensions:**  
This subclass is indented under subclass 552. Subject matter wherein the carcass plies turned about the bead rings are of such length as to extend along the side portion of the carcass a specified absolute extent or an extent that is relative to other tire dimensions, e.g., the maximum height, of the tire.
- 555 Sidewall stiffening or reinforcing means other than main carcass plies or foldups thereof about beads:**  
This subclass is indented under subclass 548. Subject matter wherein additional reinforcing structure is provided in the body of the tire from or about the rim contacting portion of the tire to the radial outer side portions of the tire carcass to strengthen said side portions of the tire.
- 556 Physical structure reinforcing cords:**  
This subclass is indented under subclass 548. Subject matter wherein particular significance is attributed to the physical characteristics of the specific material of the carcass ply or plies.
- 557 With two or more differing cord materials:**  
This subclass is indented under subclass 548. Subject matter wherein the reinforcing materials of the carcass plies are of dissimilar materials.
- 558 Carcass characterized by the reinforcing cords of each carcass ply being arranged substantially parallel:**  
This subclass is indented under subclass 548. Subject matter wherein the carcass plies are composed of reinforcing materials which extend in the same direction substantially equidistant at all points without converging or diverging from one another.
- 559 Reinforcing cords run in opposite directions in successive carcass ply, (i.e., bias plies):**  
This subclass is indented under subclass 558. Subject matter wherein the carcass reinforcing materials in the carcass plies are so disposed that the reinforcing cords in adjacent carcass plies subtend each other such that they are in a

superimposed angular relationship relative to one another.

- (1) Note. Generally in order for a carcass structure to be considered biased, the angular orientation of the reinforcing elements with respect to the mid-circumferential plane of the tire is greater than about 15° and more generally greater than about 30° and less than about 60°.

**560 Reinforcing cords of at least one carcass ply extend transversely across the tire from bead to bead, (i.e., radial ply):**

This subclass is indented under subclass 558. Subject matter wherein the carcass plies are composed of reinforcing materials which are disposed in a plane that includes the axis of tire from one of the annular anchoring elements to the other annular anchoring element.

- (1) Note. Generally, in order for a carcass structure to be considered radial, the angular orientation of the reinforcing elements with respect to the mid-circumferential plane of the tire is about 90° i.e., parallel to the tire axis, and more generally from about 90° to about 75°.

**561 Combined with a bias angled ply:**

This subclass is indented under subclass 560. Subject matter wherein the carcass is composed of both radial plies and bias plies.

**562 Cords curve from bead to bead in plural planes (e.g., S-shaped cord paths, etc.):**

This subclass is indented under subclass 548. Subject matter wherein the reinforcing materials or carcass ply are disposed in the tire casing such that a trace of the reinforcing materials elements from one bead portion annular reinforcing element to the other bead portion annular reinforcing elements includes more than one angular orientation such that the carcass reinforcing elements in said ply do not lie in a single plane.

- (1) Note. Examples Include S-shaped cord paths and paths of minimum length along the curved surface of the tire. The minimum length cord path is usually referred in the art as a geodesic cord path.

**563 Reinforcing cords of a carcass ply arranged in a crossing relationship within the ply, (e.g., woven, braided, or knitted plies, etc.):**

This subclass is indented under subclass 548. Subject matter wherein the carcass ply strengthening materials have been formed into an arrangement either by knitting, weaving or braiding.

**564 Carcass characterized by the chemical composition or physical properties of the elastomer or the like:**

This subclass is indented under subclass 548. Subject matter wherein the carcass includes a material formed by the reaction of two or more chemical substances or a combination of chemical substances exhibiting an essential or distinctive attribute to enhance the general structural characteristics of the tire.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 525, for chemical compositions or physical properties of external side wall materials, subclass 537 for belt or breaker chemical or physical properties and subclass 547 for bead chemical or physical properties.

**565 Adhesion promoter: rubber to rubber or reinforcement to rubber:**

This subclass is indented under subclass 548. Subject matter wherein a means or chemical composition is applied between or in contiguous elastomeric layers or between or in an elastomeric materials as a reinforcing element therefor to insure improved bonding.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, cross-reference art collection 910 for patents teaching means for enhancing adhesion between elastomeric material and reinforcing elements.

CROSS-REFERENCE ART COLLECTIONS

**900 TREAD PATTERN HAVING NO BLOCKS AND HAVING CIRCUMFERENTIAL**

**RIBS DEFINED BY ZIG-ZAG CIRCUMFERENTIAL GROOVES:**

This subclass is indented under the class definition. Anti-skid devices containing tread patterns enhanced by zig-zag circumferential grooves with no blocks.

**901 TREAD PATTERN HAVING NO BLOCKS AND HAVING CIRCUMFERENTIAL RIBS DEFINED BY LINEAR CIRCUMFERENTIAL GROOVES HAVING STRAIGHT EDGES:**

This subclass is indented under the class definition. Anti-skid devices containing tread patterns having circumferential ribs with no blocks enhanced by linear circumferential grooves with straight edges.

- (1) Note. The tire tread pattern found in this subclass contain ribs that are straight only.

**902 NON-DIRECTIONAL TREAD PATTERN HAVING NO CIRCUMFERENTIAL RIB AND HAVING BLOCKS DEFINED BY CIRCUMFERENTIAL GROOVES AND TRANSVERSE GROOVES:**

This subclass is indented under the class definition. Anti-skid devices containing nondirectional tread patterns with no circumferential rib having blocks enhanced by transverse and circumferential grooves.

- (1) Note. The tire tread pattern found in this subclass contain blocks only.

**903 NON-DIRECTIONAL TREAD PATTERN HAVING NON-CIRCUMFERENTIAL TRANSVERSE GROOVE FOLLOWING SMOOTH CURVED PATH:**

This subclass is indented under the class definition. Anti-skid devices containing nondirectional tread pattern with noncircumferential transverse grooves which follow smooth curved paths.

**904 SPECIFIED DIFFERENT TREAD PATTERN FOR FRONT TIRE AND REAR TIRE:**

This subclass is indented under the class definition. Anti-skid devices containing a tread pattern for a front tire designed different than a tread pattern for a rear tire.

**905 TREAD COMPOSITION:**

This subclass is indented under the class definition. Anti-skid devices wherein the chemical formulation of the tread is specified.

END